# AVIATION WEEK

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These environmental tests are just one phase of Honeywell's continuing research on aeronautical control problems. We expect not only to continue, but to expand this research program—because *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.

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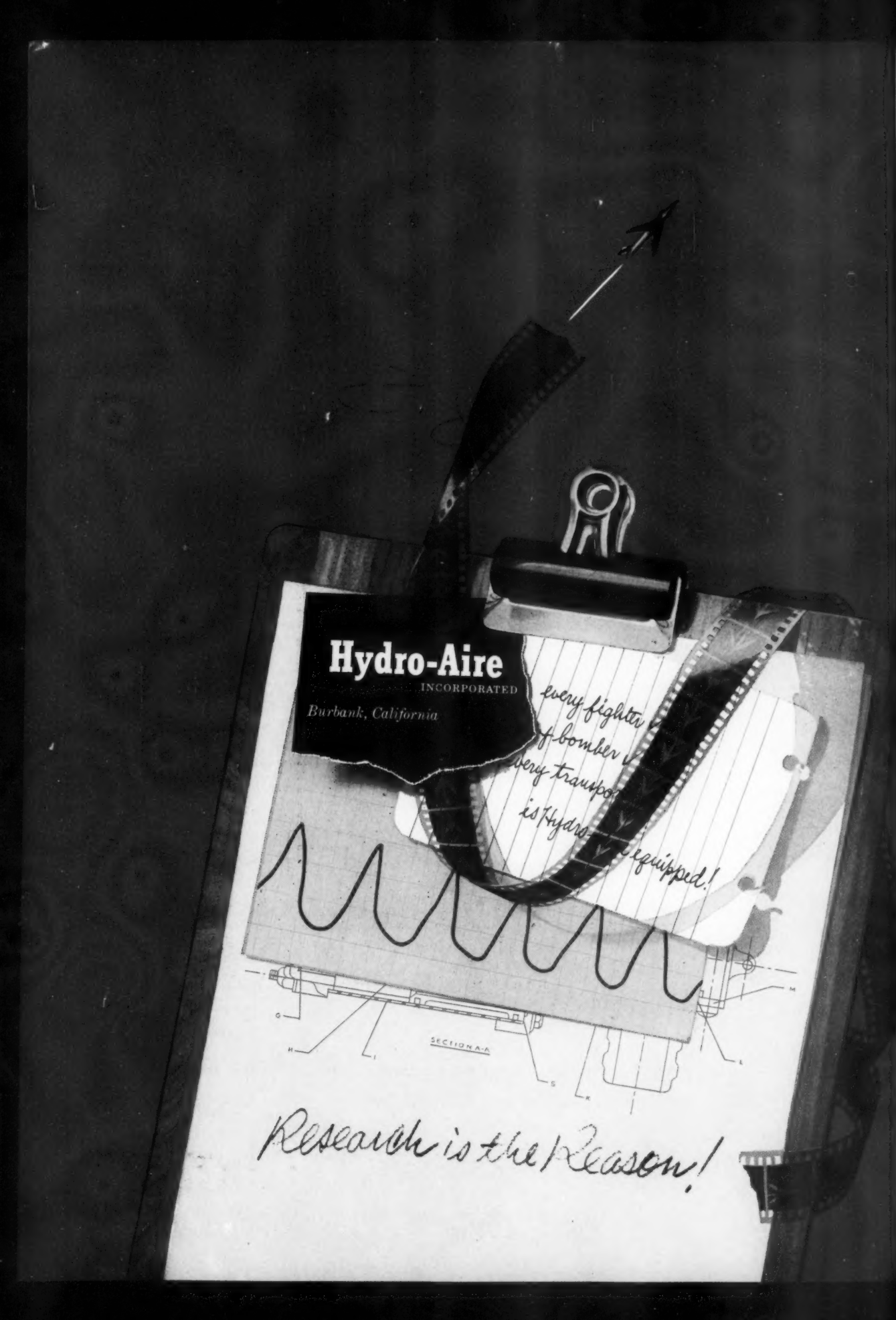
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SECTION A-A
Research is the Reason!

# B.F.Goodrich

# New B.F. Goodrich tire outwears all others in airline tests

**A NEW IDEA** in aviation tires, designed to give longer service life, has been introduced by B. F. Goodrich.

Instead of the conventional ribbed tread, the new tire has rows of "dimples" —round indentations in the rubber.

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First airline to test the new BFG Dimpled tire was Braniff International Airways, who furnished the photo above. Average tire life improved so much that they have standardized on the new tire throughout their entire fleet.

Fourteen other airlines who have tested the B. F. Goodrich Dimpled tire report the same results: the new tread outwears all others used. And five airlines in addition to Braniff have made the new tire standard equipment, in the sizes tested—on DC-3s, 4s and 6s. Still more airlines are now starting to switch.

Tooling up for production of the Dimpled tire in four additional sizes is now under way at B. F. Goodrich.

The new, longer wearing Dimpled tire is the latest "first" in aviation tires from B. F. Goodrich, the leader in rubber research and engineering. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

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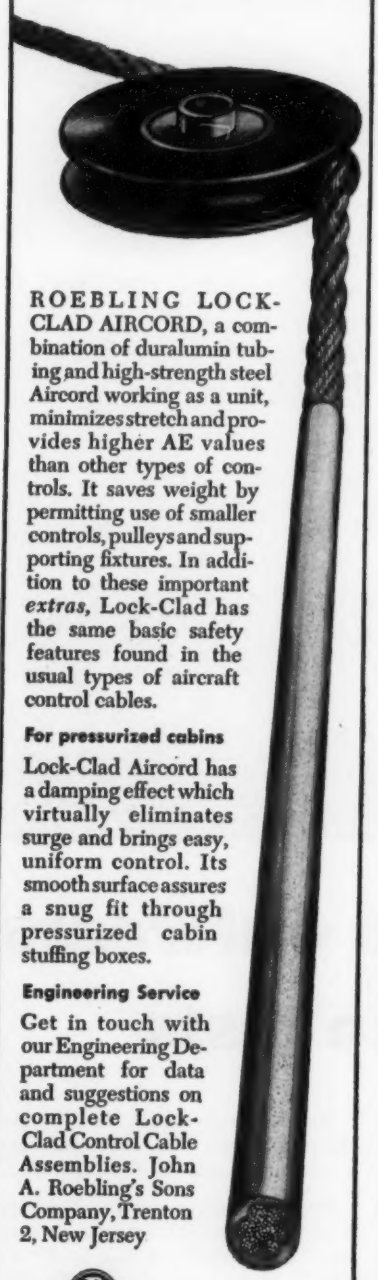

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# ROEBLING



# Aviation Week

ABP Member ABC

**Volume 55** **July 30, 1951** **Number 5**



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Leo T. Tarpey.....Editorial Makeup

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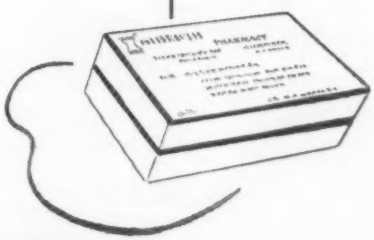

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# NEWS DIGEST

## DOMESTIC

**Personal and executive aircraft** exports (6,000 lb. empty airframe weight and under) as reported to the AIA for the month of June totaled 38 valued at $229,201. This compares with 41 planes valued at $257,984 shipped during the previous month.

**Adm. Forrest P. Sherman,** Chief of Naval Operations since November, 1949, died of a heart attack in Naples, Italy on July 22. He was 54 years old.

**Hiller Hornet,** ramjet-powered helicopter, established an unofficial altitude mark for its category by flying at an altitude of better than 7,500 ft. over Donner Pass, Calif. Pilot Bruce Jones flew the Hornet.

**W. Wallace Kellett,** 59-yr. old president of Kellett Aircraft Corp., and a director and former board chairman at Republic Aviation Corp., died July 22.

**Convair's Fort Worth division** $270,000 jet engine test stand is nearing completion. Two concrete cells can test two engines each. The control room, between the cells is protected by two-foot-thick concrete walls. Windows are three-in. thick bullet proof glass plus an extra thickness of safety glass. Walls fan out in front to deflect flying objects and allow room for propellers when turbo-props are tested.

**Ninety-Nines** 5th annual all-woman transcontinental air race is scheduled for August 15-19. Fifty planes will fly from Santa Ana to Detroit via Fort Worth. Total distance is 2,348 miles. Stock model planes are restricted to 300 hp., flying will be during daylight hours and visual.

**USAF is airlifting** the men and materiel of a fighter-escort wing (minus the F-84 Thunderjets) across the Atlantic by MATS. Simultaneously, a second group will be returned from England. Purpose of the transfer is to provide 90-day routine training program in European theater for USAF units. C-74, C-97 and DC-4 aircraft will be used.

**Pratt & Whitney Aircraft** has limited commercial production of R-2800 Double Wasp engines because of heavy military demand. Commercial production of the R-2800 is now completely absorbed through June, 1953. Ample capacity has been reserved for normal spare parts requirements.

**Alcoa's Cleveland forge plant strike** (AVIATION WEEK July 23, p. 15) received official USAF attention early last week when Assistant Air Force Secretary Gilpatric warned negotiators for the company and UAW-CIO that the Air Force might have to take further action to end the then six-week-old strike which was cutting heavily into defense production.

## FINANCIAL

**American Airlines** reports net income of $6,532,867 for the first six months of 1951, almost three times that for the same period of 1950. Total revenue for the 1951 half was $74,945,800, highest for any six-month period in the company's history.

**Pacific Airmotive Corp.** recorded its highest sales volume for any 30-day period in June, 1951, when its gross sales reached $2,294,629. Current backlog is over $10 million.

**Northwest Airlines** reported net earnings of $47,593 for six months ended June 30, compared with loss of $3,458,396 in same period last year. Gross operating revenues were $21,291,596 compared with $22,092,585 revenues last year.

## INTERNATIONAL

**Royal Air Force** is sending four Sunderland flying boats on a good will tour. The planes will spend four days at Norfolk, Va., during the 10,790-mile tour. A U. S. Navy flyer, temporarily attached to the RAF will fly one of the planes on the tour.

**D. Napier & Son, Ltd.** will build a new factory to produce Rolls-Royce Avon engines for the Canberra. Construction will start in the fall. Plant will be on a 70-acre site near Bootle, Lancashire. Total employment is expected to reach 6,000. It is rumored that Rolls-Royce is planning construction of three additional factories in Scotland to produce the Avon. Details on the construction are not yet available.

**Missing Canadian-Pacific Airlines DC-4,** carrying 38 persons enroute from Anchorage to Tokyo, is believed lost somewhere in the Alaskan Panhandle. Faint radio signals were heard, but shortly after, faded. They were not picked up again, nor has wreckage been sighted in the vicinity by the airborne searchers.


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# SIDELIGHTS

## *British Drag Their Feet*

Some Americans stationed in England tell AVIATION WEEK the British are moving at a snail's pace with their **Aviation contributions** to NATO. Major snags are in the Ministry of Supply, which seems to be having a difficult time deciding what production to allocate where. Many British aircraft plants are hamstrung with conflicting production orders.

## *Washington Notes*

The **Aviation Executives Club** at the swanky Dupont Plaza Hotel will be ready for occupancy Sept. 15. Temporary business offices are set up in Suite 519 Barr Bldg. . . . **Francis P. Whitehair**, recently resigned general counsel of the Economic Stabilization Agency, will be nominated Undersecretary of the Navy as soon as the Senate confirms Dan Kimball, present undersecretary, to succeed Francis P. Matthews.

## *Industry*

**McDonnell Aircraft Corp.** has named Jack Shea as manager of public relations. He has been chief of the Air Force's press section in Washington. . . . Employment figures released last week by **Consolidated Vultee** showed its Ft. Worth division is this nation's largest aircraft plant in terms of employment. More than 30,000 are on the payroll, highest since December, 1943. Peak wartime employment was 30,609 in November, 1943 . . . There is no foundation to rumors of a change in top management of **Convair**, according to Harry Bruno, the company's public relations counsel. Bruno, incidentally, is also retaining this account, it was said.

## *USAF*

**George Ramsey**, formerly of the Bureau of the Budget, has been named to replace Knox B. Phagan as Deputy Comptroller of the Air Force. Phagan resigned July 21 . . . **Tactical Air Command's** 18th Air Force, scheduled to participate in exercise Southern Pine at Ft. Bragg, began pre-maneuver operational training last week. Training includes a rehearsal of the airborne drop by the 504th & 505th Airborne Regimental Combat Team of the 82nd Airborne Division.

## *People*

**Jim Strebig** of Washington, D. C., aviation editor of the Associate Press, is now at St. Joseph Hospital, Fort Wayne, Ind., his home town . . . **Glen A. Gilbert**, formerly of CAA, has been appointed by ICAO as a technical aid in the Montreal headquarters. Later he will head a technical assistance mission abroad.

## *Transport*

**Slick Airways** withdrew its proposal to lease the equipment of U. S. Airlines after the Air Force objected to such re-leasing.

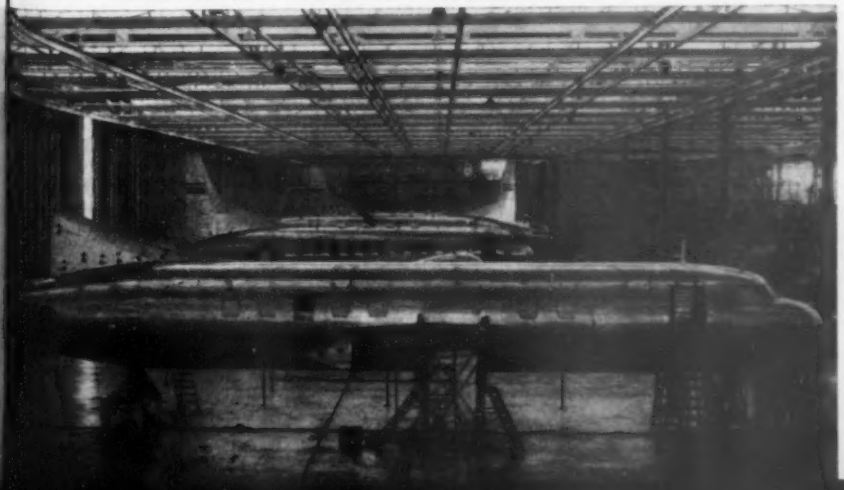
SCORPION SHOWS NEW STING—Northrop F-89 Scorpion all-weather fighter is seen firing a series of five-in. high velocity aircraft rockets (it can carry 16) during trials near Muroc AFB, Calif. The F-89 is operational with the Western Air Defense Force.

# Aviation News Picture Highlights

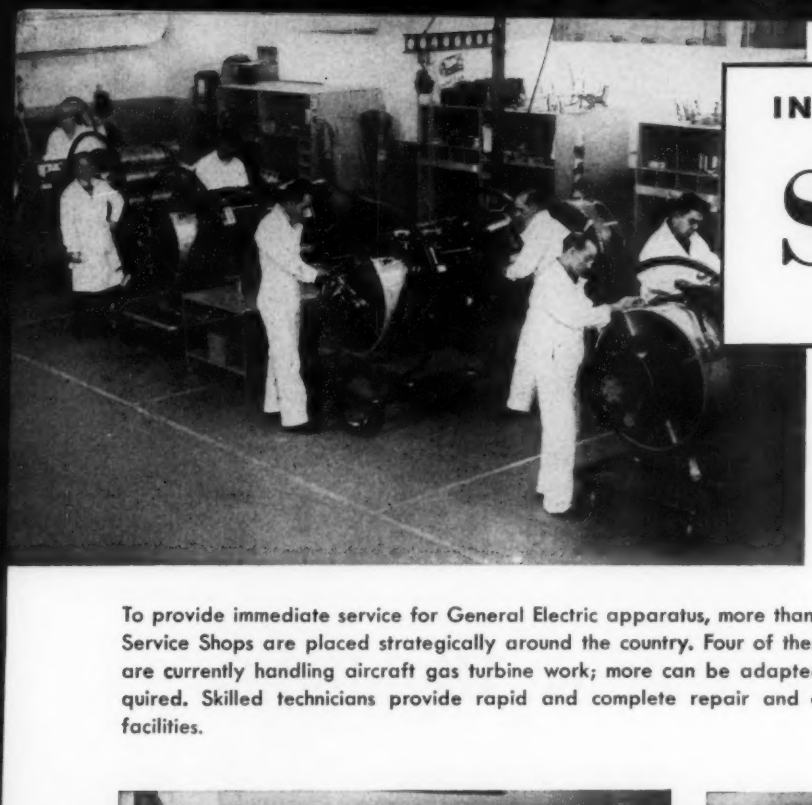
IN ITS ELEMENT—New Hawker Sea Hawk, in production for the Royal Navy, has just landed aboard HMS Illustrious during carrier trials. It is powered by a Rolls-Royce Nene.

FRENCH VAMPIRE—SNCASE Mistral is French-built DH Vampire fitted with Hispano Nene jet engine. Wing root air intakes have been considerably modified. It has a top speed of 595 mph.

340 PROGRESS—Convair-Liner 340 fuselage nears completion at San Diego, with wings scheduled to be added next month and first flight planned for prototype in October.



WELL-TANKED METEOR — Armstrong Whitworth N.F.11 has belly, wing drop tanks.



IN THE NEWS

# SERVICE

Getting top utilization from jet engines requires many techniques. Here are a few of the means used by General Electric to help the Air Force get maximum use from its J47 engines.

**To provide immediate service for General Electric apparatus, more than 30 G-E Service Shops are placed strategically around the country. Four of these shops are currently handling aircraft gas turbine work; more can be adapted as required. Skilled technicians provide rapid and complete repair and overhaul facilities.**

**At an Air Force base, a G-E representative shows Air Force personnel some fine points of jet engine servicing. To back up this field training, formal G-E jet engine schools have been functioning since 1942. Courses are now presented in familiarization, overhaul, flight test engineering, and line maintenance.**

**G-E service follows G-E equipment around the globe. Here, "tech reps" from General Electric and North American Aviation Inc. in Korea discuss combat performance of the G-E-powered, North American-built F-86 Sabre. G-E aviation field service representatives cover the vital spots in the world, are always available.**

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# WHO'S WHERE

## In the Front Office

**John M. Rogers** has been designated assistant to the president of Marquardt Aircraft Co. Rogers formerly was vice president and director of military sales for Douglas Aircraft Co.

**A. H. Borchardt** has been made a vice president of Worthington Pump & Machinery Corp., and will have overall responsibility for the sales of the firm's entire line of pumping equipment.

**Thomas C. Coyne** has been named vice president in charge of scheduling, planning and production for Curtiss-Wright Corp. Coyne, who is well versed in manufacturing procedures, joined Curtiss-Wright last year, coming from Ford Motor Co., Dearborn, where he had been director of programming and planning.

## Changes

**Edward P. Bullard, III,** has been appointed manager of the new Pratt & Whitney Aircraft branch plant at North Haven, Conn., scheduled for completion next February.

**Adm. H. B. Sallada (USN, Ret.)** has been designated manager of Chicago plant of Fairchild Aircraft division.

**Charles F. Slick** has been appointed works manager of the Fairchild Aircraft division at Hagerstown, Md.

**John C. Buckwalter** has been made chief engineer of Douglas Aircraft's Long Beach division, succeeding the late **Fred J. Stineman,** who died July 7.

**Vincent Gorguze** has been appointed general manager of Curtiss-Wright Corp.'s new Metals, Processing division at Buffalo, N. Y.

**George H. Buchner** has joined Northrop Aircraft as manager of spare parts administration . . . **J. J. Carson** has moved up to director of purchases for Kaman Aircraft Corp.; **Robert Williams** becomes purchasing agent and **Daniel Carpenter** has taken over as subcontract coordinator; **A. G. Odell** has been promoted to industrial relations director; **E. G. Conway** has been moved up to become Kaman's production manager; **E. F. Gaughan** becomes factory superintendent, and **Dr. J. H. Gelb** has been appointed chief of mechanical design.

**B. A. (Berk) Brunsdon** has joined the Aircraft Engine division of Ford Motor Co., as superintendent of final assembly . . . **Giles M. Reed,** formerly with Goble Aircraft Specialties, has joined Aviation Supply Co., N. Y. C.

**James W. Mariner** has been promoted to general sales manager of Northwest Airlines; **Charles R. Hussey** has been moved up to manager of agency sales; **William M. Hansen** has been made manager of international sales; and **David H. Newton** has been advanced to manager of sales promotion.

**William A. Fleming** has been designated publications manager for Western Air Lines.

**E. R. Mitchell** has been designated director of industrial relations of Texas Engineering & Mfg. Co., Inc., Dallas, succeeding **J. H. Baylis,** resigned.

# INDUSTRY OBSERVER

► **Interesting comparison of U. S. and British jet engines is in the offing as a result of the recent licensing deal under which Commonwealth Aircraft Corp., Ltd., will make North American F-86 Sabre jet fighters for the Royal Australian Air Force. The Australian F-86s will be powered by British Rolls-Royce Avon jet engines, rated at more than 6,500-lb. thrust. This will provide a comparison with the General Electric J-47 engines in North American's F-86s. And it will also provide another comparison of the Canadian Avro Orenda jet engine with the Avon, since the Orenda is going into Canadian version of the F-86 built by Canadair, Ltd. (Orenda and Avon also power two versions of the Avro CF-100 night fighter.) Commonwealth's F-86 program continues a licensing relationship with North American under which the Australian company has previously built NA-16 trainers (Wirraways) and F-51 Mustangs.**

► While first American-built Curtiss-Wright J-65 jet engine will probably be completed in September, it will contain a considerable number of British-built parts. Curtiss-Wright is getting its supplier program for the J-65 components well organized, but some engine components may require a production cycle of two years or more.

► **Possibility of modifying the nose of the Sikorsky S-55 8-10 passenger helicopter to permit installation of two Alvis Leonides 500-hp. engines, instead of the present single 600-hp. Pratt & Whitney Wasp, may be considered by Westland Aircraft, the British Sikorsky licensee, to meet the twin-engine safety requirement. Meanwhile Westland is also considering development of a 32-place W-81 helicopter powered by two Dart or Mamba turboprop engines, mounted directly under a four-blade rotor.**

► Use of preloaded control-centering springs in both aileron and rudder systems of a Cessna 195 airplane in NACA flight tests has resulted in remarkable improvement in spiral stability of the airplane. The craft quickly returned to straight and level flight after kicks on the rudder and would fly hands off for indefinite periods in smooth or even moderately rough air, without getting into a dangerous attitude. The experiments may ease flying for personal and small executive planes.

► **An Edo A-3 airborne motor lifeboat, dropped from an SB-29 rescue plane of the Air Rescue Service, is aiding in Kansas flood rescue work. Boat was parachuted from the plane by its 100-ft. diameter chute into a flooded field, after being flown from Maxwell AFB, Ala., 1,000 miles away, slung under the SB-29. The 30-ft. boat carries clothing and provisions for 15 survivors and has a 500-mi. cruising range.**

► Piasecki Helicopter Corp. is now subcontracting 76.5% of the dollar value of its HUP utility helicopter being purchased by Navy and Army. Of the amount, 95% goes to small business. This compares with a reported aircraft industry average of 50% of total dollar value going to subcontractors.

► **First four flights in the new Bell X-5 variable-sweepback wing research plane at Edwards AFB, Muroc, Calif., have been successful. Bell Aircraft's chief test pilot, Skip Ziegler, has returned to Muroc after a trip to Buffalo, and will continue the flight program.**

► Boeing's latest Stratofreighter, the KC-97E, which includes permanent fixtures for transformation into either an aerial refueling tanker, a cargo carrier, troop transport or hospital plane, is expected to be the new standardized version of the Air Force cargo plane. Using its self-contained power hoist, the plane can put its auxiliary fuel pumps and tanks in place on the upper deck and install the refueling boom pod in the place where the cargo-plane's clamshell rear loading doors are normally attached. Fuel and electrical lines are connected to permanent fixtures on the airplane. A prototype convertible Stratofreighter, a KC-97A, recently made the conversion from troop transport to tanker in 6 hr. 10 min., with a Boeing crew.

# Washington Roundup

## Air Power Outlook

It's wait and see on the military build-up for the next few months.

Joint Chiefs of Staff are scheduled to present a "re-appraised" program to Congress in September or October. House Appropriations Committee has marked the conferences down on its agenda.

**The key questions: How far? How fast? What direction?**

The answers hinge on international and diplomatic developments between now and the fall.

But the word in Congress now is that JCS will seek an all-around step-up, with most emphasis on air power, both Air Force and Naval aviation. The build-up is expected to require $20 billion additional, including $10 billion more to launch USAF on a build-up to 150 wings. This would bring the current 1952 fiscal year defense bill to $80 billion. That will be hard to sell to the Administration and Congress—unless there is a war scare.

Senators view three developments as pointing to a marked shift from ground forces to mobile strategic and Naval air power in the composition of the defense striking force:

- **Build-up of land strength by European nations is lagging—worse that the Administration wants to admit. This lag raises doubt of the wisdom of gearing U. S. defense to a "holding" of the Continent.**
- **U. S. air and naval bases in Spain, just negotiated for by the late Chief of Naval Operations, Adm. Forrest Sherman, plus bases in Turkey, Greece, and Africa, lessen the military importance of the heart of the Continent to the U. S., in the eyes of some planners.**
- **Reports that Russia is establishing major air bases on the plateaus of Tibet and acclimating personnel to the high altitudes.**

Between now and the fall, when JCS is due to issue its re-evaluated military program, this is the outlook:

- Defense chiefs will try to keep the country keyed to an "emergency" and stave off the creeping let-down in the defense effort.
- Congress, taking its time while echoing the defense chiefs' warnings against a let-down, may not approve before October the $60-billion military budget for the 1952 fiscal year, which started running July 1. House Appropriations Committee—the Budget's first stop in Congress—completed hearings and started reviewing money requests, item by item, only last week. It will take this committee at least two more weeks to decide what should and should not be cut. Meanwhile, Air Force and Navy are holding back on their air programs.
- Aircraft procurement funds—$11 billion for USAF and $3.5 billion for Navy—aren't likely to be touched, but funds for military administrative activities, particularly civilian employes, will be drastically slashed.
- There will be much ado in the Senate over funds for a 150-wing USAF program, instead of the 95-wing plan recommended by the Administration. There's no sign yet that the House will take up the cry.

House and Senate Democratic leadership is prepared with counter-strategy to the Republican-led drive for the build-up. Democratic leaders will say Joint Chiefs of Staff are re-appraising the military program and Congress should not act until they have presented their findings this fall.

Democratic leaders on defense affairs, such as Rep. Carl Vinson, do not mean to fill the role of seconding Republican Sens. Henry Cabot Lodge and Kenneth Wherry—the two key pluggers for the 150-wing build-up.

Two sidelights on the 150-wing program:

- **Tactical air.** The Taft-Wherry faction that wants to go all-out for strategic air and opposes the Administration's plan for a ground-tactical air action to "hold" the continent of Europe, supports the 150-wing program, even though it emphasizes tactical aviation to the extent of 50 groups earmarked for dispatch to Europe.

Their reasoning: Develop the tactical air power because it can be used for U. S. air defense and protection of U. S. strategic air bases around the world.

- **Carrier aviation.** It's going to be put on trial behind closed doors in Senate Appropriations Committee. Several members who look on it as an expensive, awkward move by the Navy to arm its way into the strategic air role plan to give Navy leaders a rough going-over on its merits. They want to channel funds earmarked for carrier aviation build-up into the 150-wing USAF program. But their drive is not likely to succeed. One reason heard around Washington: They hesitate to carry it into the open for fear of provoking the powerfully backed Navy League.

But the squeeze on carrier air will have the well-wishes of the Navy group that is unsuccessfully pressing, against the opposition of "carrier admirals," for the development of long-range bomber seaplanes. This faction claims that the seaplane can be developed to match the B-36 in performance—and it wouldn't require costly take-off bases around the world.

Navy, now barred from the strategic air role, can contract for seaplanes for cargo purposes only.

## Foreign Airmail Business

U. S. carriers get far more mail business from foreign governments than the U. S. Post Office gives to foreign carriers. In 1950 fiscal year—the latest for which data is available—U. S. carriers hauled 4.8 million ton miles of foreign airmail; foreign lines hauled only .84 million ton miles of U. S. mail.

But here are some aspects that have senators looking into the situation puzzled:

- Foreign airlines carried U. S. mail over the trans-Atlantic route for substantially less than U. S. carriers. Last year, Post Office paid Pan American an average $3.1 a ton mile and TWA an average $3.0 a ton mile for trans-Atlantic hauls. But four foreign lines—BOAC, Air France, KLM, Sabena—charged the PO only $2.6 a ton-mile. And two other foreign carriers charged less than that: Scanair, $2.3 a ton mile; Swissair, $2.2.
- Braniff Airways charged U. S. Post Office an average $62.9 a ton mile for Latin America hauls, but charged foreign governments only $2.8 a ton mile.
- Chicago & Southern charged U. S. Post Office an average $56.8 a ton mile for Latin American hauls, but charged foreign governments only $1.9 a ton mile.
- U. S. Post Office paid foreign carriers only a fraction of what it paid Braniff and Chicago & Southern for Latin America hauls: Air France, $2.4 a ton mile; BSAA, $3.1 a ton mile; CIA, $2.4; Cubana, $2.8; and LAV $1.3.
- Colonial Airlines charged U. S. Post Office an average $31.6 a ton-mile for Bermuda hauls, but charged foreign government only $2.2.

—Katherine Johnsen.

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# Legal Maneuvers Mark ALPA Week

**Operations now 'normal,' new leadership says, but receivership is threatened if factions do not agree.**

The Air Line Pilots Assn. was back to normal operations last week, including resumption of mediation of the United Air Lines dispute. Barring one possible contingency, relations with airlines would continue much as before the intra-union wrangle touched off by the board of directors' vote to oust President David L. Behncke.

The possible contingency was the repeated threat by Master-in-Chancery Victor E. Larue to recommend a receiver be appointed for the union if a settlement could not be reached between Behncke and the directors' choice to succeed him, Clarence N. Sayen. A receiver would not only control union funds; he would have to get court approval for each contract negotiated. All attorneys concerned, veterans of labor practice, concede a receivership would wreck the union.

▶**Case in Court**—Sayen and his group contended the union was back to "normal operations," and surface appearances bore him out. But Behncke, through his attorney, claimed everything being done was without authority; so most of the week was devoted to legal tussles.

The $2-million lawsuit filed against seven directors by four pilots friendly to Behncke was to be dismissed by mutual agreement. Behncke attorney Leon M. Despres appeared in court to dismiss the suit.

A new attorney for Behncke, I. Harvey Levinson, appeared asking for permission for Behncke to intervene in the suit. So the dismissal could not be entered.

▶**Injunction Sought**—An injunction against Behncke, restraining him from interfering with the union, was asked by Edwin R. Hackett, attorney for Sayen's group.

A suit against the bank holding ALPA funds was threatened by Levinson.

That tangle was winnowed down to this:

- **Behncke withdrew his petition** to intervene in the $2-million suit and that action was dropped.
- **The suit against the bank** had not been filed by mid-week.
- **The plea for the injunction** against Behncke was entered and Behncke given until today to answer.

That was the only remaining legal action. But it was bad enough from both sides. Hearing the injunction would take weeks, perhaps months before final decision, and it would go right to the heart of the matter: the legality of the ALPA directors' action in "recalling" Behncke.

▶**Behncke Protest**—Behncke insisted the action was illegal, that he was still president, that only the members could vote a recall under the by-laws of ALPA (which the directors changed). Further, Levinson, Behncke's attorney, told the master-in-chancery that the directors' vote to pay Behncke's $15,000-a-year salary for life was also illegal because the entire meeting was illegal.

Whether legal or not, the chances of Behncke's getting the $15,000 dwindled with each new action he took. Sayen declared that most members were reluctant to vote the pension in the first place. Now, he says, protests are snow-balling.

▶**Pension vs. Presidency**—If the court should find that the directors acted illegally, Behncke would still be president—at least temporarily—and still wouldn't get his pension. According to Levinson, Behncke is not interested in the pension nearly as much as he is interested in retaining the union's presidency. And, says Levinson, Behncke is receiving phone calls, telegrams and letters from many pilots in the field voicing their support.

Regardless of the eventual outcome of last week's legal maneuvers, Behncke's reign as active head of ALPA is ended, if the new administration ac-

## Patterson Sees Stalemate

United Air Lines President William A. Patterson last week described the refusal of UAL pilots to fly bigger, faster DC-6Bs without a new working agreement as a "synthetic problem."

United, he said, has year-to-year contracts and can meet changing conditions quickly.

As he talked with newsmen in Los Angeles, where UAL directors were meeting, the dispute which had led to the carrier's cancellation of 9,300 miles of route operation (AVIATION WEEK July 23, p. 16) was back for consideration by the National Mediation Board in Washington.

Patterson said negotiations with the Air Line Pilots Assn., representing the protesting pilots, were stalled with no prospects of solution. The only problem was mileage limitations, he asserted; the pilots were satisfied with their salaries.

But he added that the pilots showed no signs of giving in, and he would not budge from his own stand because he believes the pilots are wrong.

He said the pilots would have a right to be concerned about jet and turboprop planes and necessary adjustments in pay when those planes arrive.

But he asked, "How can we be intelligent about a problem we don't understand yet? We can't settle tomorrow's problems today."

United was losing $90,000 a day in gross revenue, the UAL head said, because of the pilots' refusal to fly the Bs. UAL has eight of the big planes grounded, including one delivered last week.

Patterson's remarks indicated that the situation was further complicated by the ouster of David L. Behncke as ALPA president. "We don't know whom we are dealing with," he said.

He expressed the opinion that it was illegal for ALPA to fire Behncke since the union by-laws stated that he could not be ousted until next year's election. He said he thought the pilots went further in their strike than Behncke intended and, when Behncke tried to put on the brakes, he found they were greased.

curately reflects the feelings of the members. Sayen and his legal advisers believe they have acted strictly according to law. But should the court find that the ALPA board of directors did not comply with all union or legal provisions in ousting Behncke, Sayen is confident the membership will repeat the ouster in a manner that can be approved by the court.

▶ **Dispute Effect**—Only effect of the current legal squabbles, the new ALPA leaders feel, is to delay the time when they have full undisputed authority to act for the association. They have no doubt at all that the members desire new leadership.

Further, they say, this desire for new leadership is not of recent origin. It was not inspired by the handling of the United Air Lines strike, nor by the firing of Sayen, Larry Cates, union Washington representative, and several other ALPA officials. Seeds of dissatisfaction were sown over many years and by many acts of commission and omission by Behncke.

Most of the complaints revolve around Behncke's insistence on running a one-man show. The new leaders contend that more than once the former president moved personally into a situation that had been going satisfactorily for the union and disrupted the proceedings. And they cite instances of alleged capriciousness, such as the recent ALPA participation in the Prototype Advisory Committee. Behncke attended the first meeting, appointed a delegate for the next meeting, replaced him for the following meeting and finally sent still another representative on the European study trip of the group's subcommittee.

Result, ALPA men say, is that no union representative was able to get the complete picture and adequately represent the union.

▶ **New Methods**—This is the type of administration that the new leaders hope to correct by "better business methods." They are not yet ready to spell out in detail what those better methods will be. But Sayen does point out that ALPA membership includes graduate aeronautical engineers, attorneys, economists, and others whose knowledge can be utilized to promote the aims of the union. He expects to call on these men as they are needed in union affairs.

Behncke's attitude towards this can be simply put: The union's affairs never have been in better shape. He has built the organization with much effort and in face of many obstacles. Now it is a complete, well-financed, respected union—and "is a nice plum for somebody to step into."

He has not resigned and he has disavowed as without authority the statement issued allegedly on his behalf by Despres (AVIATION WEEK July 23 p. 16), which gave the impression Behncke had given up the fight. Behncke has remained in his office at ALPA headquarters; returned to turn over the key to Sayen and refused to attend meetings seeking a settlement of the dispute. He feels to do so would indicate actions of Sayen's group have legal basis.

While dissatisfaction with Behncke's administration goes back a number of years, the spark that touched off the revolt was the report by the special five-man investigating committee appointed by the executive board in June. Behncke, in his capacity as president, voted for establishment of the investigating group. Even when the report was turned in, Behncke perhaps could have retained his title as president if he had promised to abide with reforms recommended by the investigators. When he refused to do this, the executive board felt it had no alternative to proposing his recall.

The investigating committee recommended changes in accounting practices, completion of the ALPA building, an executive committee of five pilots, regional offices and the reorganization of national headquarters.

# CAB Shifts on Miami Interchange

## Board rescinds National-Panagra pact, but puts Braniff in the act; Grace sells NAL holdings.

Pan American Airways' thrust at its offspring, Pan American-Grace Airways, hit a sharp blow at Panagra—but boomeranged on both PAA itself and Panagra.

Civil Aeronautics Board gave PAA its wish: vetoed Panagra's bid for east coast traffic for Latin America. But, in doing so, the Board decided to give Braniff Airways, competitor in Latin America of both PAA and Panagra, a Miami stop to draw eastern traffic.

▶ **Results in General**—The two CAB actions added up to this:

• **Through service from New York to Buenos Aires,** connecting the eastern seaboard with South America's western seaboard, over the systems of National Air Lines, PAA and Panagra, is out for a long while. PAA and Eastern Air Lines bucked the Panagra deal with National.

• **Braniff Airways** can now compete with PAA and Panagra for a connecting link at Miami—National or Eastern—to feed eastern seaboard traffic into its South American network.

▶ **Results in Particular**—Specifically, the Board's orders, both temporary pending decision on a proceeding embracing all the issues raised in the establishment of through service from the eastern U. S. to western South America, did this:

• **The first order** rescinded temporary approval of a Panagra-National interchange agreement and an amendment to a PAA-Panagra agreement which, taken together, would have provided one-plane service between the northeastern part of the U. S. and points in South America utilizing Panagra aircraft over the routes of the three carriers.

The interchange agreements were part of a plan originally worked out for Panagra with National by W. R. Grace & Co., which shares equally with Pan Am in Panagra ownership. PAA was an unwilling participant. In approving them in April, CAB presumably thought the carriers still favored them. But the key to PAA's endorsement was the two agreements repudiated by NAL: an option by PAA to acquire 30% of National's stock; a National-PAA interchange under which PAA planes would operate over National's New York-Miami route under charter to National. National, with 17.4% of its stock held by Grace, backed down on these.

▶ **The Outcome**—As a result, PAA launched its drive against the Panagra-National interchange which would permit Panagra, influenced by W. R. Grace Co., to tap the lush New York market, and lined up with Eastern.

Although Panagra's stock is 50% PAA- and 50% Grace-owned, Panagra's president, Andrew Shea, a Grace representative, has taken over direction of the airline.

In the background is strife between PAA and Grace directors on Panagra—the PAA faction aiming to keep Panagra in status subsidiary to PAA operations and the Grace faction wanting full-fledged airline status for the carrier as an appendage of the Grace company.

The Panagra-National interchange, opposed every inch of the way by PAA, was never implemented.

▶ **Outlook Poor**—CAB commented in rescinding its approval: "National and Panagra might, of course, after prolonged judicial controversy establish their right to operate the agreement as it now stands. However, it is clear that whatever the ultimate outcome might be, there is no chance of the interim service by a cooperative effort of the air carriers concerned which we contemplated being established."

At the last minute, W. R. Grace & Co. sold its total stockholding of 174,000 shares in National to that carrier. The transaction was completed a few hours before release of the Board's order

of which Panagra and National management presumably were unaware.

Grace officials said the action was taken to clear the way for Panagra's interchange arrangement with National.

Observers predicted that the action would nullify the inquiry launched recently by CAB, at PAA's prodding, to learn whether Grace could be considered as having control of National. The Civil Aeronautics Act has been interpreted as forbidding control of an airline by a steamship company. The Grace Line is a W. R. Grace & Co. enterprise (AVIATION WEEK May 14, p. 60).

• **The second order** granted Braniff a Miami stop on its Houston-Havana route that feeds into its South American system, but rejected Braniff's bid for connections from Miami to Washington and New York.

CAB pointed out that the big share of eastern U. S. traffic to South America is now moving over the PAA-Panagra system. During a test period, 15 times the traffic went from Miami over the PAA-Panagra system that went from Havana over the Braniff system. CAB said it intended and wants the two systems competitive.

▶ **Braniff Problems**—Reason Braniff has largely been squeezed out of eastern traffic; National, has never made satisfactory connections at Havana with Braniff flights. Passengers have had to put up with long stopovers. In addition, they have had to undergo two immigration screenings—at Havana and their Latin America destination point. Passengers embarking from Miami are subject to only one screening at their destination. Braniff complained that a passenger never travelled more than once over a National-Braniff routing.

Simultaneously with the orders, CAB called a pre-hearing conference on the all-embracing case for through service from the eastern U. S. to South America —the so-called New York-Balboa case— and announced that hearings would open before CAB Examiner Thomas Wrenn "not later than Oct. 1."

▶ **New Alignment**—Meanwhile, here's the changed jockeying positions:

• Braniff can now play for an arrangement with Eastern as well as National.

Braniff, though, will not be able to channel Midwest traffic on its domestic network into Miami, as a terminal point, or pick up traffic at Miami to feed into its domestic points. It is barred, too, from engaging in local Miami-Havana operations.

• **Eastern is no longer restricted to PAA** in its bid to get South American traffic channelled into its network.

• **PAA can now flirt with National,** now presumably a free-agent with the shadow of domination by Grace removed though most observers feel such a move is unlikely.

## Quesada Quitting In Policy Squabble

Lt. Gen. Elwood R. "Pete" Quesada, who has just completed a two-year assignment as commander of Joint Task Force III conducting Atomic Energy Commission's tests at Eniwetok Atoll in the Pacific, will probably retire Aug. 31, an Air Force spokesman told AVIATION WEEK.

Reports that Quesada had asked for retirement recently because of disagreement with present Air Force policy on the development of tactical air power, are true despite official USAF comment to the contrary, the spokesman said.

The Air Force last week officially discounted published reports stating that Quesada was disgruntled with present policy on tactical air support and said "the Secretary of Air Force and the Chief of Staff of the Air Force have reluctantly agreed to give further consideration to his (Quesada's) request for retirement, which he has indicated he intends to submit in the immediate future."

Quesada, 47, made a brilliant record for himself as director of World War II Ninth Fighter Command which, among other missions, provided cover for the Normandy landings. He later became commanding general of the Ninth Tactical Air Command.

▶ **Wide Background**—He won his wings in 1925 and in 1929 was a member of the crew of the Question Mark, a three-engine Fokker that flew over San Diego, Calif., in the first successful aerial refueling flight. Quesada was military attache in Cuba during the 1930s and subsequently served as technical adviser to the Argentine air force for two years.

Following his tour of duty as CG of the Ninth Tactical Air Command he returned to the U. S. in 1945 as Assistant Chief of Air Staff for Intelligence. Just before taking assignment as commander of JTF III, Quesada headed a special board on USAF reserve affairs and later was Chief of Technical Planning Committee for the Joint Chiefs.

Before taking assignment with Joint Task Force III, an Air Force spokesman said, Quesada was already in complete disagreement with Air Force policy in tactical aviation matters and said that it was for this reason Quesada was given the relatively unimportant reserve job.

Quesada, he said, took exception to this duty and asked for his retirement but the Air Force urged him to stay on. As incentive for Quesada to stay the spokesman continued, USAF handed him command of JTF III and promised him an important tactical assignment on his return. It has not been forthcoming, the spokesman added.

Quesada himself had no comment.

## 'Top 50' List Has 19 Aircraft Firms

Adm. D. C. Ramsey, Aircraft Industries Assn. president, has advised Sen. John J. Sparkman that the U. S. aircraft industry is using more than 60,000 subcontractors, of which 87% are small business firms, employing 500 or less workers.

The AIA message went to the chairman of the Senate Select Committee on Small Business after he had released a report on concentration of defense contracts in industry. This showed that ten large manufacturing companies have received 40% of the total dollar volume of defense contracts since Korea, and that 50 companies have almost two-thirds of the total dollar volume.

Listed as top ten prime contractors, as of June 1 were the following companies:

▶ **"Honor Roll"**—General Motors, $3.5 billion; Ford Motor Co., $1 billion; Boeing Airplane Co., $960 million; Curtiss-Wright Corp., $840 million; Lockheed Aircraft Corp., $674 million; Republic Aviation Corp., $549 million; General Electric Corp., $500 million; United Aircraft Corp., $490 million; North American Aviation, Inc., $481 million; and Grumman Aircraft Engineering Corp., $410 million.

Eleven other aircraft companies made the Sparkman "honor roll" of the top 50 companies, in this order: 13, McDonnell Aircraft Corp., $269 million; 14, Bendix Aviation Corp., $265 million; 21, Sperry Corp., $198 million; 23, Douglas Aircraft Co., $172 million; 24, Consolidated Vultee Aircraft Corp., $152 million; 27, Fairchild Engine & Airplane Corp., $127 million; 29, Bell Aircraft Corp., $125 million; 32, Avco Manufacturing Corp., $122 million; 34, Northrop Aircraft Inc., $119 million; 35, Glenn L. Martin Co., $108 million; 41, Beech Aircraft Corp., $86 million.

# Fletcher Shows Armed Lightplane

Newest in a series of lightplane competitors which are currently being demonstrated to the Army as potential rocket-launching platforms and low-level attackers against ground troops, is the one-place Fletcher Model FD25 Defender, which has already been demonstrated to the Marines and Ground Forces.

Built by Fletcher Aviation Corp., Pasadena, the Defender is powered with a 250-hp. engine, and weighs only 1,160 lb. empty. It is credited with a maximum speed of 166 mph. with external load or 187 mph. without, and has a 144-mph. cruising speed and 41-mph. landing speed, its manufacturer reports. Range of the Defender is quoted as 560 mi.

▶ **External Load**—Here is what the manufacturer says the low-wing monoplane will carry in external armament load combinations: two 40-gal. Napalm bombs, or two 250-lb. bombs, or thirty-two 2.75-in. folding fin rockets, in launchers, or forty 2.75-in. rockets in banded bundle mountings, or four 5-in. HVAR rockets. Each combination is supplemented by 2,000 rounds of .30 cal. machine gun ammunition fired from two wing gun installations.

Obviously aimed at getting in under the 2,500-lb. weight limit for Army airplanes, the Defender has a design gross weight of exactly 2,500 lb.

It is up against competition from other small rocket- and-machine gun armed planes such as the Temco T-34 and Beech T-35, and the even tinier Mooney one-place Mite in a military version.

Selection of either the two-place Beech or Temco planes as an elementary Air Force trainer, might be expected to enhance either's chances for a small order of armed planes for field tests. The Fletcher and Mooney planes however are more specialized and presumably will depend solely on their practicability as air-to-ground weapon carriers, along with possible use as inexpensive personnel carriers. There has been some limited use of North American T-6 trainers as armed planes in Korea, as a forerunner to this new weapons trend.

Fletcher has purchased old Los Angeles airport, now Rosemead Airport, for $900,000 and is setting up a plant there, where the Defenders will be built if contracts are completed. Other business will include operating the airport, manufacturing spare parts and conducting a repair shop. The field is expected to be the largest private airport in the Los Angeles area when its modernization which has been projected by Fletcher is completed.

## Civil Plane Rate Of 3,500 Asked

Air Coordinating Committee last week agreed to recommend priorities authorizations for a minimum level of 3,500 industrial, agricultural and executive airplanes a year. The committee will back the program in requests to Defense Production Administration and National Production Authority for materials schedules to assure this level of production.

The ACC action followed justification of the figure as essential to national defense and the civil economy by CAA as the claimant agency, supported by statistical studies on aircraft use, and by findings of the Air Transport mobilization Task Group of National Security Resources Board.

The 3,500-a-year figure represents a 1,000-plane increase over the interim figure previously adopted by ACC. While it compares closely to recent years' production figures of light aircraft, it is only a small fraction of the average annual production since the end of World War II.

CAA considers a production of 3,500 planes will be sufficient to assure continued employment of a nucleus of skilled aircraft and engine mechanics. Industry is asked to work with the CAA to assure that new aircraft produced under this program are sold only to persons and firms in defense activities and essential civil activities.

# New Big Boy

### Convair YB-60, 8-jet, sweptwing B-36 version to fly in November.

While Consolidated Vultee's giant sweptwing, eight-engined jet bomber was officially designated YB-60 today by the Air Force, a battle is rapidly developing behind the scenes to keep it from temporarily becoming the world's largest glider.

The big bomber, now under construction at Convair's Ft. Worth plant, is tentatively scheduled to make its first test flight late in November, providing production of Pratt & Whitney's 10,000-lb.-thrust class J-57 jet engines are available.

Pratt & Whitney delivered its first J-57 to the Boeing Airplane Co. in June and will deliver a number to Boeing to enable it to conduct considerable test runs, have enough for engine spares, plus the eight needed for B-52 installation.

▶ **Air Force Doubtful**—Consolidated-Vultee needs a similar quantity for similar purposes for its B-60 program, but Air Force isn't sure that Pratt & Whitney production will be sufficient to meet the fat needs of both companies, an AF source said.

Air Force is now reexamining Pratt & Whitney production schedules and so far is planning to put both Boeing and Convair on an "austerity basis" in regard to their J-57 requirements, he said, so that each can meet flight test schedules.

The Boeing B-52 was selected as successor to the present production Convair B-36 two years ago. But an economy slash at that time forced temporary shelving of the original plan and it was decided to stick to the B-36 as weapon in-being for the Strategic Air Command. Subsequent international events, however, brought about an increased Air Force budget and USAF again became interested in production of the B-52.

▶ **Two Companies**—Early this year, Air Force gave the go-ahead to Boeing to begin a modest tooling up for quantity production of the B-52 and in February told Consolidated Vultee to build a jet-engined version of its B-36. At that time it was decided that both companies would each build two heavy bombers and that then a comparison evaluation would be run with a production order to the winner.

Further deterioration of the international situation decided Air Force to order the Boeing B-52 into major production even before its production prototype was in test flight. Finletter advanced the reason at a recent press

conference that the decision was being made before the plane was test flown because sufficient flight experience on the B-47 (smaller counterpart of the B-52) had been gained to warrant ordering B-52 production.

Convair, meanwhile, was pressing for rapid construction of the B-60. Reports are that the plane is fast taking shape at Ft. Worth and that it will be ready for flight on schedule in November if the engines are available.

▶**Higher Thrust**—Air Force sources state that several other engines of considerably higher thrust power are now being built and that B-60 installations may utilize one of these newer engines as soon as they become available in quantity. These sources were doubtful, however, that the newer engines would be in sufficient production to permit their test and installation in the B-60 by November.

Fuselage of the B-60 is the same as its predecessor, the B-36. Wings and tail, however, are swept back at a 35-degree angle. Lateral tail surface is slightly raised and given a low dihedral. Engines are slung in nacelles below the wing—two in each nacelle.

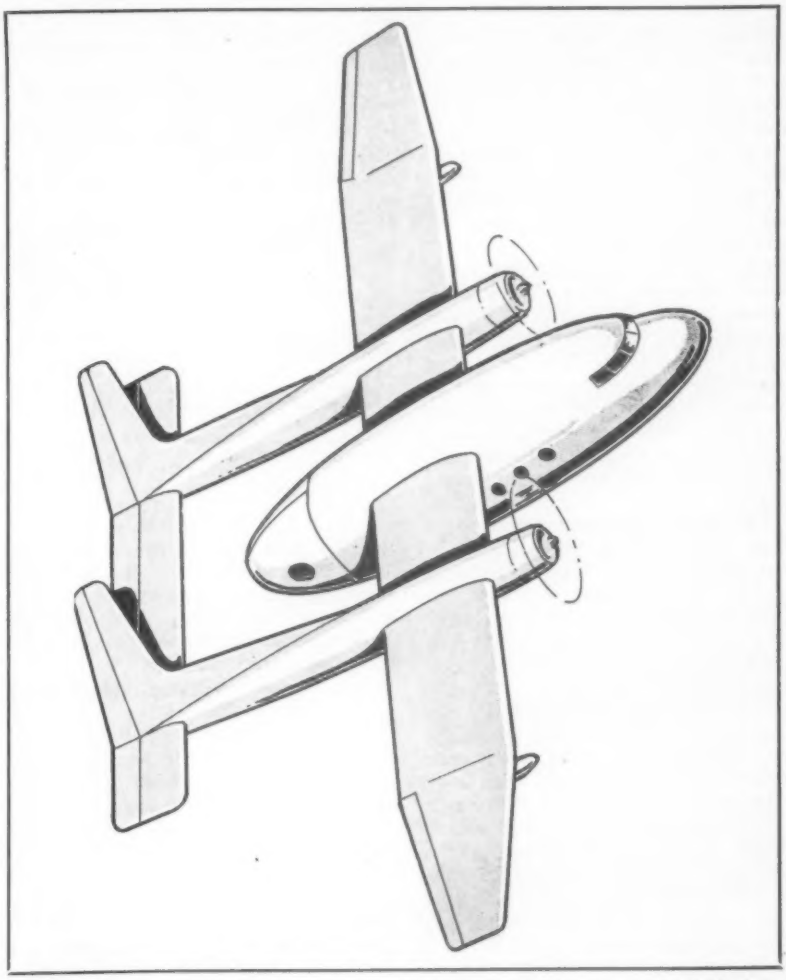
Design performance figures of the B-60 call for a bomber capable of carrying a 10,000-lb. payload 10,000 mi. at a speed of 550 mph. and at an altitude above 45,000 ft. Crew complement remains the same, 11, plus a four-man relief crew.

## C-W Backlog Tops $1-Billion Mark

New military letter contracts for engines and propellers have virtually tripled the Curtiss-Wright Corp. backlog since March 31, swelling it to more than $1 billion, President Roy T. Hurley has announced.

Hurley said Curtiss-Wright is subcontracting 60% of its manufacturing program, with over 1,000 subcontractors in 20 states. The corporation is aggressively pursuing the policy recommended by the Senate Small Business Committee to spread the work widely to guarantee a broad and growing industrial base, he said.

The present Curtiss-Wright position as one of the top ten companies holding 40% of the total dollar volume of defense contracts is in marked contrast to the relatively modest volume of business on the books of the company before it entered the jet engine field a year ago, when it got license for production of British Armstrong Siddeley engines in this country. Its two principal engine production items currently are the J-65, developed from the Armstrong Siddeley Sapphire, and the R-3350-30W compound engine.



AVIATION WEEK SKETCH shows how enlarged wing will look on new Fairchild plane.

# USAF Buys Big-Wing Packet

### Fairchild C-119H seen as quick answer to Army need; will move 22,000-lb. cargo into front-line bases.

By Ben S. Lee

The Fairchild Engine and Airplane Corp. has been awarded an Air Force development contract for a radically re-designed C-119 Packet featuring a 40% greater wing area. This means bigger payloads, longer range, and slower landing characteristics.

Fairchild's big-wing proposal does not put the plane in official competition with specifications issued by USAF for the 25,000-lb.-payload all-purpose turboprop transport, but it does put it in actual competition with all planes in its weight class as the most realistic approach to the immediate and urgent military transport problem.

The new C-119H Packet has been designed specifically to meet Army combat cargo requirements for a plane that will move approximately 22,000 lb. of cargo directly into a forward staging area, where it can be transloaded immediately to trucks.

In this respect it is a competitor of the new Lockheed medium transport turboprop plane which won the recent Air Force competition (AVIATION WEEK July 9, p. 16). But the Fairchild development, making use of many service-tested features of the earlier Packets, could have a considerable time and dollar advantage in getting into production, over the entirely new Lockheed design.

This advantage stems partly from the fact that the Air Force medium transport competition requirements called for new and relatively unproven turboprop engines and expanded the Army's original load-carrying requirement to 25,000 lb. for 2,500 mi.

▶**Korean Lesson**—New plane require-

ments for airlifting bigger loads greater distances directly into forward areas developed from the obvious lack of such equipment in Korea. It was a source of considerable consternation to military strategists to find that material airlifted to battle from the United States had to be landed at big bases in Japan and re-loaded into smaller planes for front-line base landings.

The Combat Cargo Command, established under Maj. Gen. William H. Turner, performed this transshipping mission with Fairchild Packets and and Douglas C-47s. The CCC did an admirable job of hauling everything that was needed at the front, from Kleenex to bridges. But Military Air Transport Service, charged with global transport, felt that CCC was serving a duplicating mission.

The Army requirement was for a plane capable of moving a 22,000-lb. payload directly into a forward staging area for discharge directly from cargo-cabin to trucks, or integral rear ramp discharge to ground. As the requirements passed through various Air Force staff agencies concerned, including MATS, military characteristics were expanded to a point where the prototype called for a plane dependent upon several co-developments still years away.

▶**Transport Competition**—Bids were nevertheless submitted to the aircraft industry to design an aircraft around the following capabilities: carrying a 25,000-lb. payload 2,500 mi.; takeoff within 3,000 ft. over a 50-ft. obstacle using Rato: landing within 3,500 ft. using brakes only; 250-knot minimum speed using turboprop engines. Lockheed Aircraft Co. was named winner of the competition.

While the other major aircraft manufacturers labored in competition to design the new turboprop-powered transport around a set of very complex USAF specifications based upon the transport requirement issued by Army, Fairchild was quietly going ahead with a radical re-design of its present equipment which would enable it to fill the Army requirements virtually overnight.

▶**Performance**—Design performance of the C-119H calls for a crusing altitude of 10,000 ft. as most economical, a service ceiling of 21,000 ft., and a stall speed of 79 knots at 85,450-lb. gross takeoff weight. This is with a payload of 27,200 lb.

Operating on a combat mission of 500-mi. radius of action, the C-119H will have spectacular performance. The plane is capable of taking off over a 50-ft. obstacle within 2,600 ft., landing within 1,300 ft. and delivering a 27,200-lb. cargo. (Poundage delivered by the H in this operation is 7,200 lb. more than could be delivered by its predecessor.) The H plane could then take off and return to base without refueling and land within 900 ft. with necessary fuel in reserve.

Operating on a combat mission of 900-mi. radius of action and utilizing the same crusing altitude and at 85,-450-lb. take off weight, the C-119H is designed to get off in 2,600 ft. and land within 1,250 ft. to deliver a 21,800-lb. cargo. The C-119C on an 800-mi. mission, delivers a 15,200-lb. payload.

The new C-119H stacks up with its predecessor C-119C as follows:

| Specifications | C-119C | C-119H |
|---|---|---|
| Wing Span | 109 ft. 3 in. | 148 ft. |
| Length | 86 ft. 6 in. | 95 ft. 8 in. |
| Height | 26 ft. 3 in. | 31 ft. |
| Gross Weight (Max.) | 73,150 lb. | 85,450 lb. |
| Power Plant | Two 3,500-hp. P&W 4360-20W | Two 3,500-hp. Wright 3350-30W |

Lateral and vertical tail surfaces of the C-119H are essentially the same in appearance as those of the C-119C although they are somewhat larger. To handle an approximate 40% gain in total wing area of the new design, nacelles have been extended aft approximately 9 ft. and the tail plane has been increased in span by 24 ft.

Elongated dorsal fins, to improve directional stability of the C-119C, have been retained in the H. The twin rudders and vertical fin have been extended and, with the addition of outboard horizontal stabilizer tips and elevator extensions, the overall tail area has been increased in proportion to the wing area.

The cathedral center-wing section of the C is eliminated in the H and a straight-wing section is added in its place. The new center section is 40 ft. longer than that of the C. Considerable speculation is already rising among aircraft manufacturers as to what the ultimate big-wing C-119 will become. The present twin-engine configuration, they point out, has even greater potentialities as a 4-engine long-range transport.

▶**Same Fuselage**—Interior dimensions of the fuselage are the same for the H version as for the C-119C. Cabin length is 36 ft. 11 in., width 9 ft. 2 in., height 7 ft. 8 in. The cabin has a floor area of 353 sq. ft. and normal seating capacity for 42 although arrangements to evacuate 78 persons can be made in an emergency. The monorail system has a capacity for handling twenty 500-lb. bundles.

Time for unloading transports in combat areas is precious. To facilitate this operation, as with other C-119 types, the entire rear section of the plane is hinged for easy access to the cargo compartment. A short ramp, permanently hinged at the rear entrance and forming a part of the rear loading doors, is then lowered and equipment may be unloaded directly onto the ground or into waiting trucks.

▶**Powerplant**—Width between nacelles of the C-119H is increased by 28 in. over that of the C to permit placement of the engines and booms 14 in. further from either side of the fuselage. This is a net gain in clearance between prop tips and fuselage and will permit later modification to larger propellers, engines, or widening of the fuselage.

The C-119H is to be powered by two Wright R-3350-30W compounded engines delivering 3500 hp. (wet) each and driving two four-blade Hamilton Standard propellers 15 ft. 1 in. in diameter. Switch from Pratt & Whitney 4360-20W engines currently used in the production C-119C is scheduled when Fairchild modifies the C-119 to F series. This series contemplates switch to the R-3350 but still retains the Hamilton Standard prop. Additional changes in the F requires use of a larger hydraulic system.

The Fairchild C-119G calls for a switch to Aeroproducts propeller, among other modifications, but it is unlikely that the G series will be built if the company goes into production with its proposed larger C-119H.

## Damage Slight in Two Connie Mishaps

Two Lockheed Constellations suffered mishaps recently. Yet only one sustained any damage and none of the total of 93 passengers or 14 crew members was injured.

The first, on July 17, was a KLM Royal Dutch Airlines' plane which aborted a takeoff from New York International Airport for Amsterdam. As the ship started its takeoff roll it began veering to the left off the runway. The pilot managed to bring the nose wheel and right main gear back on the runway momentarily. By this time the airplane had reached a runway intersection, where it again swung left and plowed some 200 to 300 ft. into the sand.

KLM officials say the cause of the incident was maladjustment of the return spring in the nose steering control valve.

The following day an Eastern Air Lines Connie, flying non-stop Newark-Miami was cruising at 18,000 ft. in severe turbulence near Richmond, Va. Shortly after entering a heavy hail storm, vibration from a so far unrevealed source wracked the aircraft. Captain Armstrong, a 20-year pilot, immediately started letting down. When he broke out of the cloud deck he saw Curles Neck farm and elected to belly the ship in rather than return to the Richmond airport. The plane was damaged somewhat but is considered reparable by Eastern. A small fire in one of the engines was quickly extinguished.

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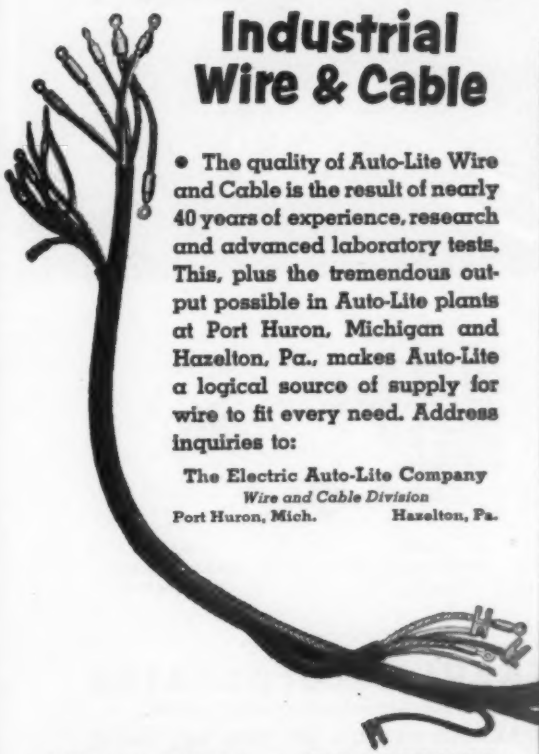

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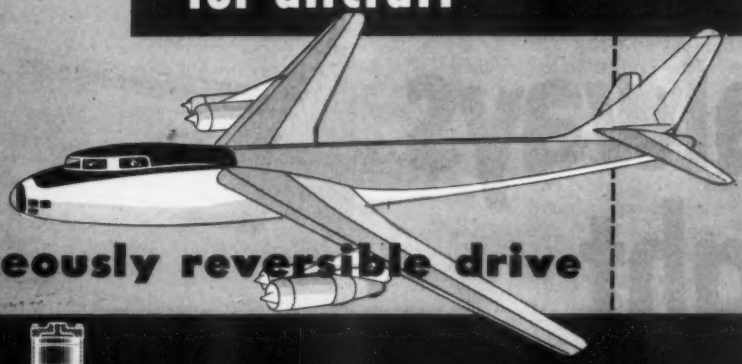
# VICKERS hydraulic drives for aircraft



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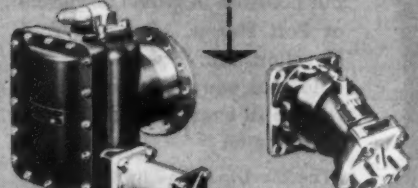
Vickers Hydraulic Drives for aircraft have very high horsepower/weight ratios. They are infinitely variable and reversible without gear changes or clutch mechanisms, may have either manual or automatic speed controls, and are so sensitive that they can be actuated by a few milliamps of signal current. Response is extremely rapid and precise due to low inertia of axial piston design of both pumps and motors. Motors deliver full torque over entire speed range and there is no radio interference. Vickers Hydraulic Drives have a variety of applications including cabin compressors, gun turrets, control surfaces, etc.



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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

# Avionic Advances Revealed by Honeywell

**Five devices now being built or developed indicate progress.**

By David A. Anderton

**Minneapolis**—The Honeywell Aeronautical division paused to take stock recently—and made public some of the results of that inventory. The occasion was the formal opening of the new aeronautical engineering building of the Minneapolis-Honeywell Regulator Co., one of the pioneers in the field of automatic control systems.

The reason for the new building became apparent after representatives of the technical aviation press and local newspaper, radio and television reporters were briefed on the current status of projects at Honeywell's aero division. Not only is the division actively pushing production and development of five projects of its own, plus a substantial amount of research and developmental work on other projects, but it is also to be a second source of supply for the Lear F-5 autopilot, ordered by the Air Force in quantity.

So, Honeywell is a busy place. There was ample evidence of that during the inspection tour of the shop and test facilities. And the growth of the aero division is just as startling as some of the avionic wizardry displayed here.

In the last four years, for example, Honeywell's expenditures for research and development have increased 500 percent. In the last two years, manpower has doubled. In 1947, there were 24 design teams—composed of designers, research and test engineers and the necessary draftsmen and technicians to support the task—and today that number is more than 130 with possible increase to about 150 before the end of the year.

Following is a roundup of what those design teams have produced and are currently working on:

• **Control Wheel Steering**—In its present stage, this gadget is an accessory to Honeywell's E6 autopilot, of the type now in service on the B-36 and B-50. Basically, the device—bearing an inevitable nickname, "Easy Joe"—permits the pilot to maneuver a plane while the autopilot is engaged. The stick force the pilot feels is only a fraction of the actual force: but to save the airplane from Easy Joe's strength, it has limits engineered into its own system.

"EASY JOE" control wheel components (arrows); control panel, master switch not shown.

This is a somewhat different approach to the problems of automatic flight, where the autopilot is generally charged with the job of keeping the airplane straight and level. To maneuver a craft under conditions of autopilot on, the pilot must disengage the automatic pilot and then cope with normal stick forces.

But with Easy Joe, the pilot pushes a little button in the top of the wheel and the system is alerted: Any maneuver within the capacity of the system and the airplane can be made with the button engaged, and Easy Joe helps make the maneuver. After the plane has been turned, releasing the button switches in the conventional aspect of the autopilot again, and the craft goes to straight and level.

The system has been under development for two years, and is still considered experimental by Honeywell. The usual master control panel has been eliminated in the clean installation which makes visible only three cockpit items: a master on-off switch on the instrument panel, a small cylinder on top of the control column, and the button on the wheel. The master control panel is built in the control column.

• **Improved Fuel Gauge**—Honeywell developed a capacitance fuel gauge, currently installed on about 40 types of airplanes, because of the inherent errors of float-type systems. The capacitance gauge measures the quantity of fuel left in the tanks electrically, and gives the answer to the pilot in terms of pounds of fuel.

But this isn't what the engine cares about. It wants to know the total amount of energy left in the tank—in other words, it wants to know how many Btu. are left. The pilot, on the other hand, would like to know how many minutes he has left.

Getting these answers is quite a problem.

For one thing, the possibility of using different fuels in jet engines means that there are different electrical characteristics for each fuel. And so a special compensation, referred to as FDI (Fuel Deviation Index) has been incorporated

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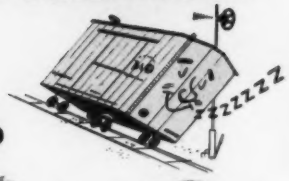


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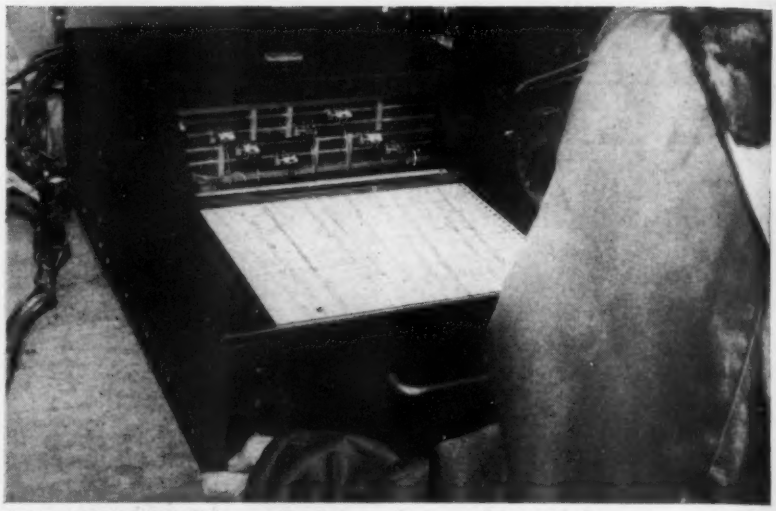


EIGHT-CHANNEL flight recorder shows performance data as inked traces on paper strip.

in the capacitance gauge. This gives an accurate measurement of the quantity of fuel, regardless of the type.

There is another angle to Honeywell's fuel gauge—totalization. In earlier systems, the pilot needed a gauge for each set of fuel tanks, or a selector switch and a single gauge. In the new system, the totalizer gets individual signals from each tank, adds them and gives the pilot an answer of fuel remaining.

• **CG Control**—In the developmental stage is a scheme for center of gravity control. This is important, because the use of thin wing sections has relegated fuel storage to the fuselage. But emptying of fuselage tanks creates considerable travel of the center of gravity. Honeywell engineers say that with the next step in fuel measuring systems, the system itself will be instructed to control fuel transfer pumps in such a way as to keep the plane in proper balance. One step further is to take into consideration the ammunition or bombs or rockets expended and their effect on CG.

The ultimate measuring system will give the pilot his remaining flight time. That development is currently being worked on.

• **Altitude Controller**—This little (coffee-can size) device was originally conceived to meet the AMC's requirements for a stabilized bombing platform. Its major purpose is to keep bombing craft at the drop altitude, rather than have them balloon upward with the dropping of each bomb from the craft.

It functions as an avionic brain and controls the autopilot; its sensitivity was demonstrated by John Sigford, Honeywell's chief aero engineer, who lifted the prototype model of the controller about ten inches off the table. In the operating autopilot, relays clicked, indicating that the small altitude change had been felt, measured and applied as a correction to the autopilot.

This control could be applied to jet fighters, one example of use being to monitor altitude on over-water flights, a pilot fatigue problem. Another use foreseen would be in helicopters, to control hovering altitude for rescue work.

The aneroid principle is the actuating system for the control; a computer feeds into the autopilot the information obtained from sensitive counterparts of the altimeter and the rate-of-climb indicator.

• **Flight Recorder**—This is a portable, eight-channel recorder developed primarily for testing Honeywell's own equipment in flight. It can be set up in any convenient location and fed information from the control components or surfaces being tested.

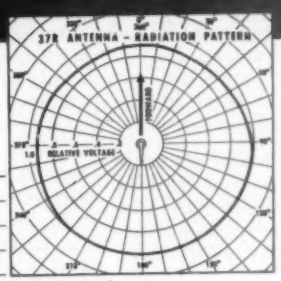
Data are recorded on a paper chart, fed through the recorder and marked by ink-fed pens. One advantage is that the recording traces are visible at all times to an observer, and corrections or alterations in test procedure could be made in flight instead of having to wait for the usual photographic records or telemetered data to be read and calculated.

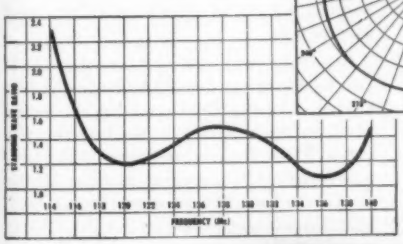
The instrument can be adapted for recording any function whose amplitude, frequency or recurrence with time is desired.

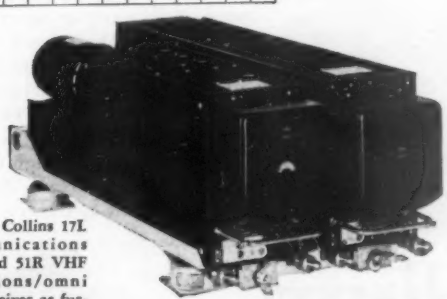
• **Temperature Control**—In this field, Honeywell is getting back to its traditional first line of business. Temperature control of a cockpit is quite a problem, because of aerodynamic heating of the skin and the ventilating air (the latter by ram compression). And so a plane can be barrelling along at high speeds in a sub-zero atmosphere, and the cabin temperature can be above human endurance.

Although Honeywell does not make ventilating systems (they make nothing but control systems) they have devel-

# NEW! VHF COMMUNICATIONS ANTENNA FOR AIRCRAFT





Left to right: Collins 17L VHF communications transmitter and 51R VHF communications/omni navigation receiver as furnished in specially designed dual shockmount.

This is a portrait of the new Collins 37R-1 antenna, made expressly for use with the Collins 51R-17L two-way VHF communications system. It is designed for the most efficient radiation and reception of vertically polarized communications signals in the frequency range of 118 to 136 megacycles. Note the excellent radiation pattern and standing wave ratio graphed on this page.

The 37R-1 mounts externally on the skin of the aircraft. Its mounting base, identical with the Collins type 37J-2 omni antenna, greatly simplifies installation especially on pressurized aircraft. Only the r-f connector protrudes through the skin of the ship.

We invite inquiries and investigation of this highly specialized and effective development.

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# What's doing at JACK & HEINTZ

## J&H Motors, Actuators Power IFR Installations

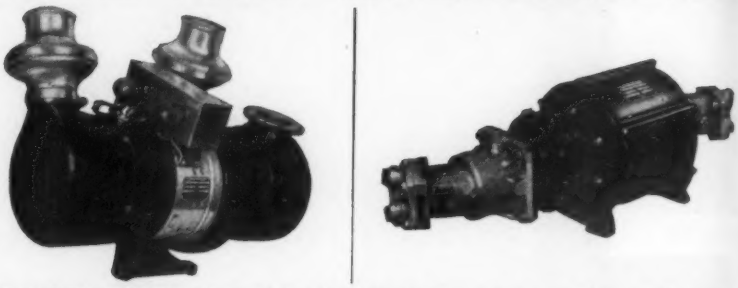
### OPERATE BOOM AND PUMP FUEL

Working with the pioneers of in-flight refueling, Jack & Heintz has developed electric motors for hydraulic and fuel pumps and hydraulic boom actuators with special features required for this service.

The J&H DA15, a 9.5 hp, d-c motor with integral pump, boosts pressure to permit rapid fuel transfer from tanker planes. It operates in explosive atmospheres. Special arrestors on air inlet and outlet ducts confine flames from any possible explosion in the motor chamber, while relieving motor internal pressure harmlessly through the ducts.

Other features include thermal protection, self-cooling for continuous duty to 25,000 feet, and radio noise filter.

Positioning of the boom is accomplished with J&H D15 and D16 hydraulic actuators. The D15 extends and retracts the boom while the D16 raises and lowers it. Power for these actuators is supplied by a hydraulic pump driven by a J&H DA17 motor.



FUEL PUMP MOTOR shown on left, has integral pump, flame arrestors and thermal protection. Two J&H Hydraulic Actuators, like that on right, extend and hoist refueling boom. A J&H motor operates the hydraulic pump that powers these actuators.

### Chief Engineer's Corner

The special motors for in-flight refueling are typical examples of special application aircraft motors J&H has developed. Our engineering department is organized to handle the unusual problems that arise in the development of special motors.

For instance, one of our customers required a motor with windings able to withstand boiling high octane gasoline. Available impregnation varnishes would not give satisfactory service. The materials section of the engineering department devised a new impregnation varnish that would withstand boiling gasoline for thousands of hours, with no perceptible change in insulating qualities. As a result, our DA19 motor is being used to power a new type of fuel booster pump, where it operates submerged in gasoline.

Another interesting development is the vest-pocket size DA22 motor, featuring a brake operated by the same magnetomotive force that turns the rotor. This eliminates many of the previous difficulties experienced with a-c brake motors. The motor is $2\frac{5}{16}$ in. o.d. and $3\frac{1}{2}$ in. long, weighs 2.1 lbs. and is rated at one-quarter hp at 10,500 rpm, on an intermittent duty basis.

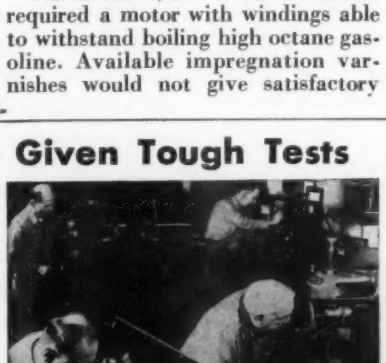
If you need an aircraft motor, please submit all available environmental and application data. Our engineers will be glad to work with you to choose the best type and design to meet your needs. Write JACK & HEINTZ . . . Cleveland 1, Ohio.

## Rotomotive Devices Given Tough Tests

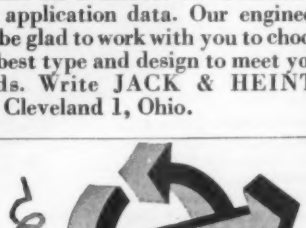
Exhaustive testing is a religion at Jack & Heintz. The ability of a device to meet normal conditions is just a beginning.

Then the torture starts—in the cold room at −65°F.—in the hot room at 160°F.—in the humidity and fungus chamber—through the salt spray test—on the vibration tables—in the radio noise room—on the starter inertia stand and the dynamometer—in the electronic test rooms—and finally in a "test house", under construction, where aircraft equipment is subjected to actual flying conditions without ever leaving the ground.

Because *Rotomotive* equipment must meet so many different conditions, we design and build much of the test equipment we use. Pictured is a laboratory workshop where test panels are being built and parts machined for other J&H test apparatus.



JACK & HEINTZ *Rotomotive* EQUIPMENT



**means electrical, hydraulic or mechanical devices designed to solve unusual problems of developing power, controlling it, or using it.**

WOBBLE TABLE is a test procedure to subject gyros to accelerated service conditions.

oped a control for cabin temperature. By means of sensitive, ultra-fast temperature measuring devices with anticipation built-in, the system mixes cold outside air and hot engine compressor air in the correct proportion and routes the mixture through the necessary intercoolers and mixing valves.

▶ **Research Contracts**—Honeywell has an imposing list of research projects underway, financed in about equal amounts by military funds and M-H money.

• The engineering section has just completed a study for the Office of Naval Research on automatic approach, landing and cruise control, and the system is slated for installation in the Douglas F4D, and the Grumman F7F and F6F.

• One of the most interesting studies now underway—and hardly more than named by Hugo Schuck, Honeywell's aero research head, because of security—is an automatic carrier landing system under cognizance by BuShips.

• AMC sponsors B-line, an evaluation of bomber performance. This is not the type of thing that leads to a production contract of hardware, but is only an evaluation by Honeywell systems and technicians.

• For the All-Weather Flying Division, Honeywell has been developing the automatic master sequence selector, which is the next step to the completely automatic airplane. This system is for a B-50, and features a punched card memory which actuates the computers of the airplane control system.

As examples of the kind of thing for which M-H is spending its own research funds, there are studies of aircraft dynamics, autopilots, automatic controls, hydraulics, electronics and magnetism. Magnetic amplifiers are being developed, as are floating gyros, in which the gyro rotor is suspended in a liquid of density sufficient to float the rotor.

▶ **Impressions, First-Hand**—These research and development projects were outlined by Sigford and Schuck; in between the presentations, there was a trip of inspection through the M-H aeronautical building.

The office space is neat and open; color styling has been used throughout in excellent taste. By contrast, the shop areas for manufacturing and assembly seemed crowded and even dirty. Lab and test areas were open and clean.

A major portion of the new building is to be devoted to production of the Lear autopilot; this section is not yet occupied, but is currently being finished.

Probably the best impression one could obtain of the aero division was given jointly by Sigford and Schuck in their presentations.

Their talks, plus the demonstrations and charts prepared as graphical illustration of the job being done, underscored the quality of work at Honeywell's aero division. And that quality was emphasized by the workmanship of the components demonstrated.

## Midget Relay

A midget relay, designed for airborne armed services applications, has been developed by the R-B-M Division of Essex Wire Corp., Logansport, Indiana.

The relay can be furnished with single pole, either normally open or normally closed; two-pole, normally open or normally closed; and single-pole, double-throw contact form. It can be made available in up to 4-pole, double-throw in standard contact arrangement.

Maximum rating is three amps. noninductive at 28 v. dc. Maximum capacitance between contacts and to ground is 2½ micro-microfarads.

Further information may be obtained by writing the manufacturers.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# Tiny Transistor

## Midget amplifying device draws only 0.6 microwatts power.

A new type of transistor, the tiny amplifying device invented at the Bell Telephone Laboratories, has been stated to have "astonishing properties never before achieved in any amplifying device." And development of the original transistor has proceeded to the point where it is ready for commercial application.

In making its announcement, Bell credited Dr. William Shockley, who initiated and directed the transistor program, with predicting the new type two years ago as a result of theoretical studies he carried on as part of the Laboratories' broad transistor physics program.

▶ **Two Transistors**—The original type of transistor invented by Shockley is identified by the term "point contact." In the unit, two hair-fine wires rest on a small piece of germanium, a semi-conducting metallic element. There is no glass envelope needed, no vacuum, and no heating element required. The entire transistor is housed in a metal cylinder about the size of a .22 cal. shell.

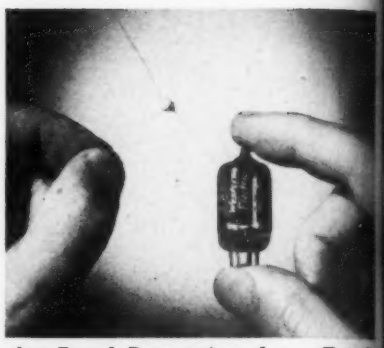
The new gadget, termed a junction transistor, is even smaller.

This transistor has no point contacts, which in the original type corresponded to the terminals of a vacuum tube. Instead, the unit consists of a tiny rod-shaped piece of germanium, treated so that it comprises a thin, electrically positive layer sandwiched between two electrically negative ones.

The name is derived from the junctions between the negative ends and the positive layer. The entire rod is encased in a hard plastic bead about ⅛ in. dia., with wire leads connected to each of the three regions and extended outside. In this form, the transistor takes up about 1/400 cu. in., whereas typically, a sub-miniature vacuum tube occupies about ¼ cu. in.

▶ **Transistor Details**—Bell says that the most remarkable feature of these new transistors is their ability to operate with exceedingly small power consumption. The best example quoted is that of an audio oscillator which requires for a power supply only 6 microamperes at 0.1 volt. This is only 0.6 microwatts of power which is in sharp contrast with the million or so microwatts required to heat the cathode of the ordinary receiving vacuum tube.

The power-handling capacity and efficiency are high. The design can be varied to permit the dissipation of power up to about two watts. And further, the static characteristics are such that class A efficiencies of 48 or 49 out of a possible 50 percent can be realized. For



class B and C operation, these efficiencies are correspondingly high, reaching as much as 98 percent.

The unit is compact and rugged. The plastic bead enclosure gives a very sturdy unit with high shock load resistance.

Vibration tests in the audio frequency range produce no measurable microphonic noise.

Input and output impedances are always positive, whether the transistor is connected with grounded emitter, grounded base or grounded collector. Thus by choosing the appropriate connection, a considerable variety of input and output impedances can be obtained.

Collector capacitance limits the frequency response at full gain to a few kilocycles, but it is possible to use a suitable impedance mismatch to maintain the frequency response flat to at least one megacycle while still obtaining a useful amount of gain.

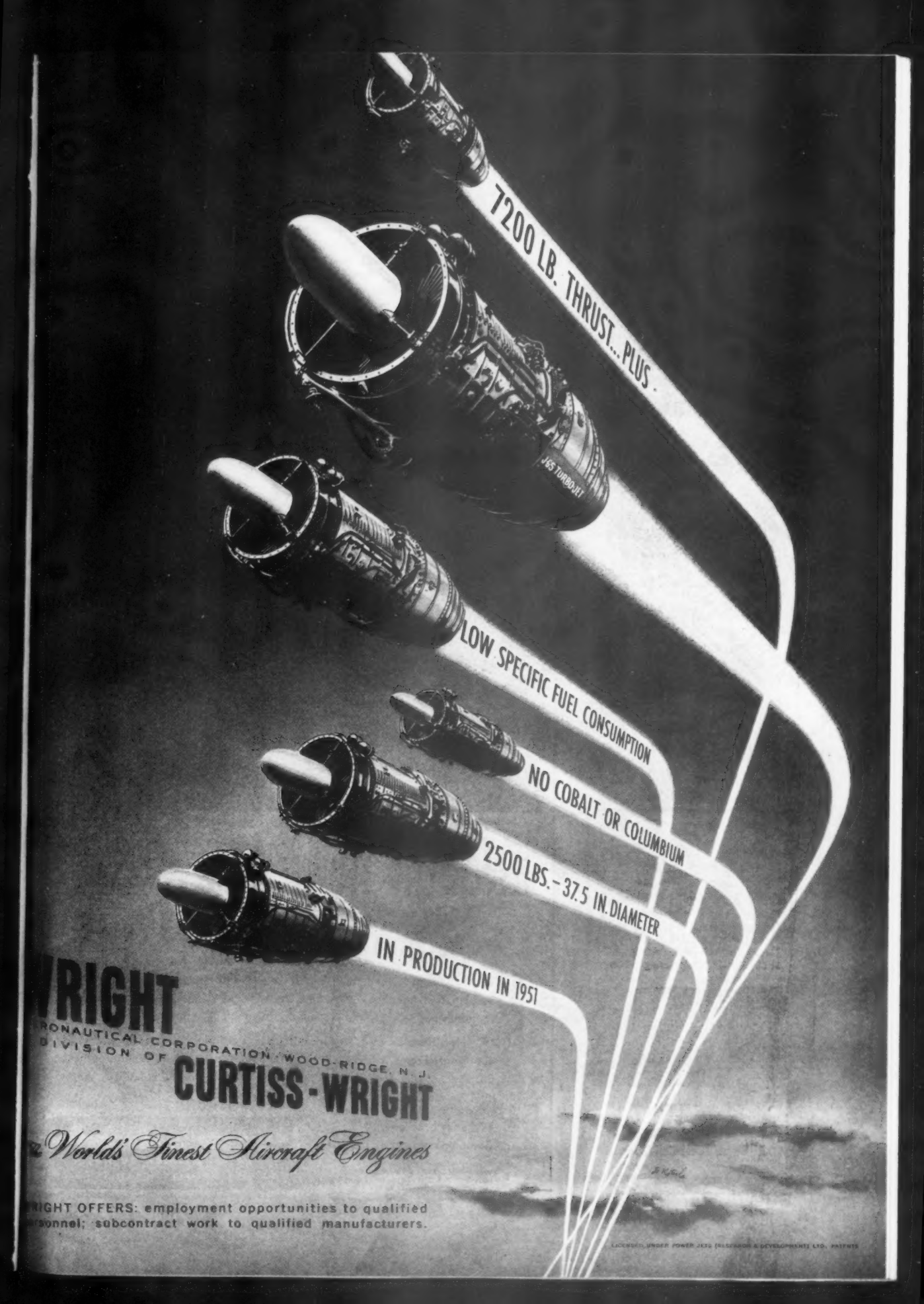
At 1,000 cps., most of the units measured have shown a noise figure between 10 and 20 db. Power gains of the order of 40 to 50 db. per stage have been obtained.

▶ **Commercial Use**—Bell says that their developmental work on the original point-contact transistor has progressed to the point where this type will be put into trial use in the Bell system early next year, in equipment manufactured by the Western Electric Co. for nationwide long-distance dialing systems.

Transistors of the point-contact type are as uniform in performance as vacuum tubes, which achievement, says Bell, is a very significant advance over transistor work two years ago. Then, the transistor was highly variable in characteristics and not reliable.

But Bell's development work solved the problems of reliability and reproducability, and it is now expected that regular production can be started. Transistors have been produced which can take shock and vibration better than any known vacuum tube. Further, transistors are expected to have service life longer than current commercial vacuum tubes.

Bell says that the transistor can be designed for many specific functions, and that its performance range can be extended to include many applications which now require vacuum tubes.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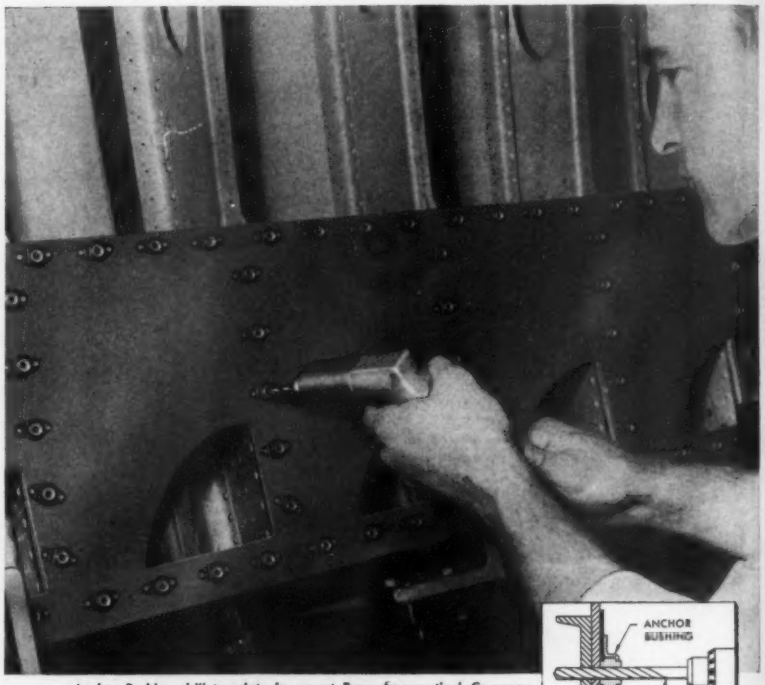
## Static Discharger

A new system for controlling precipitation static on aircraft has been patented recently by Prof. Homer J. Dana, director of the Engineering Experiment Station of the State College of Washington's Division of Industrial Research.

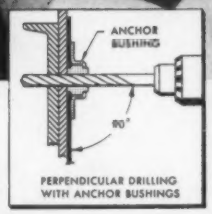
Precipitation static is a phenomenon associated with aircraft flight through rain, snow or sleet. An electrostatic charge accumulates on the surface of the craft, and builds up until some sharp edge emits a corona discharge. This discharge interferes with radio reception.

And as aircraft get larger and go faster, the precipitation static problem becomes more acute. The charging rate on the plane's surface is directly proportional to the area bombarded by the moisture particles and to the cube of the indicated air speed.

Prof. Dana's system uses a discharger to bleed the charge from the plane. Just before operation of the discharger, the radio is blocked out momentarily. Then the radio is automatically turned back on again, while the corona discharge is so low that it makes no objectionable interference. Between listening periods, the interruptions are so short that they are unnoticed and the signal as heard sounds continuous.



Anchor Bushing drill template in use at Ryan Aeronautical Company

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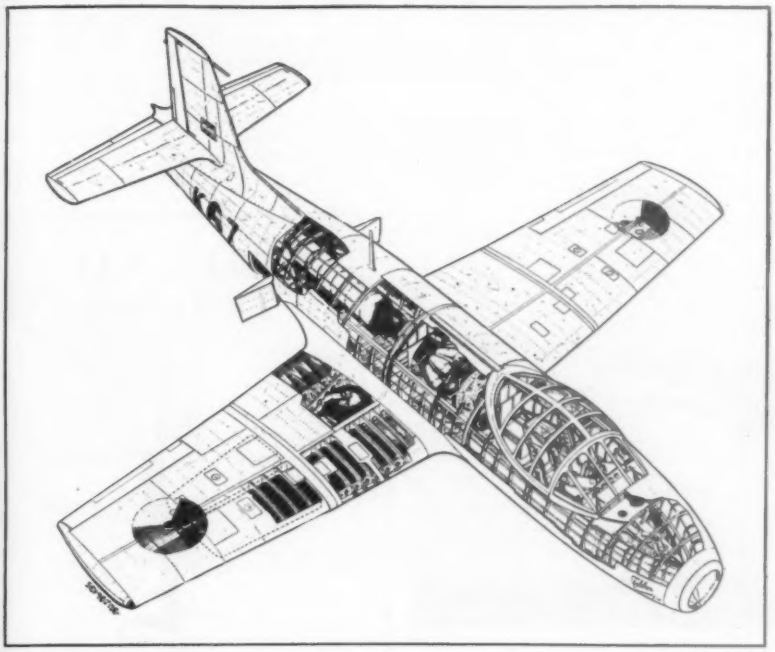
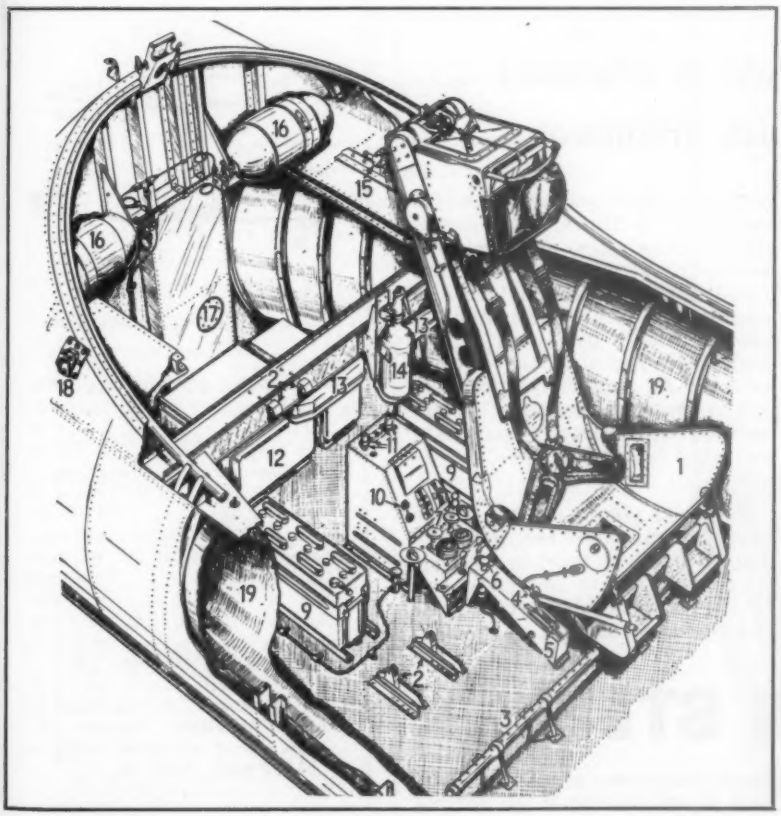
# Fokker S.14 Jet Trainer Takes to the Air






**Side-by-side seating featured in transition training craft.**

By Irving Stone

A new member of the family of trainers built by the Royal Dutch Aircraft Factories (Fokker) has taken to the air.

This latest addition—the S.14—is the first designed-from-scratch jet trainer as distinguished from a modification of an existing jet fighter. And it continues the Fokker scheme of side-by-side seating to facilitate instruction.

►**Trainer Series**—The S.14 is the third in Fokker's recent trainer string. First was the piston-engined S.11 (AVIATION WEEK June 6, 1949, p. 25), which was also built as a nosewheel version, the S.12. Next came the S.13, a crew trainer powered by twin piston plants (AVIATION WEEK Oct. 2, 1950, p. 28). The S.14 followed and is powered by a single Rolls-Royce Derwent IX.

The earliest of the family, the S.11, already is the standard trainer for the Netherlands, Italian and Israeli Air Forces, and is being built under license in Italy by Macchi and I.M.M.

►**S.14 Scheme**—The S.14 was specifically developed as a transition jet trainer—to eliminate the need to modify fighter aircraft for dual instruction.

Built in accordance with the design requirements for airplanes for the Royal Air Force and the Royal Navy, it embodies the general characteristics of the "hot" jet fighter, but affords more cockpit space, has its speed trimmed to a maximum of 440 mph. at 25,000 ft., and its wing loading cut to a shade under 33 lb./sq. ft.

This lower wing loading will cut landing speed and minimize control difficulties for the trainee.

Construction of the S.14 is straightforward, and emphasis has been placed

**S.14 COCKPIT DETAILS: 1, ejection seat; 2, co-pilot seat points; 3, heating pipe; 4, windshield heat control; 5, heat and ventilation control; 6, windshield de-icer pump lever; 7, oxygen regulator; 8, dive-recovery flap control; 9, battery; 10, fire extinguisher and canopy fuse; 11, booster pump test switches and lamps; 12, radio; 13, oxygen economizers; 14, hand fire-bottle; 15, sealing cock; 16, oxygen bottle; 17, gearbox driveshaft access door; 18, canopy lock; 19, air intake ducts.**

on easy accessibility and general simplicity.

▶ **Cockpit Makeup**—Twin ducts from the nose air intake run along the fuselage sides to the plenum chamber in the engine compartment, which is made up of stainless steel bulkheads and stainless steel skin.

Cockpit accommodates two Martin-Baker ejection seats. There are full dual controls. Stick grips carry a firing button for rockets or bombs, gun trigger and brake lever.

Instrument panel is hinged to the rear for easy accessibility and carries these units for the trainee: artificial horizon, directional gyro, rate-of-climb, turn-and-bank and airspeed indicators, Machmeter, altimeter and sensitive altimeter. For the instructor, there is installed a sensitive altimeter, Machmeter combined with airspeed indicator, gyro compass, vacuum gage, ammeter, clock, and these indicators—turn-and-bank, engine speed, oil pressure, jet pipe temperature, wing flap position, fuel level, brake pressure, landing gear emergency control pressure and position, and free air temperature.

Under the instrument panel is the switch panel for electrical and radio installations.

There is a centrally located control pedestal, and the cockpit also houses the batteries, radio receiver and transmitter and oxygen bottles.

The large canopy affords wide vision and is jettisonable.

▶ **Easy Access**—Fuselage rear section is integral with the vertical tail, is bolted to the center section for detachability and carries three fuselage-type dive brakes.

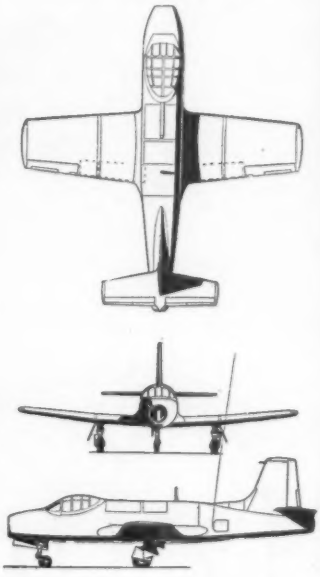
Fuselage upper and lower surfaces are fitted with numerous inspection panels for easy access to controls, electrical installations, de-icer tank, flap and brake systems, and powerplant.

▶ **Wing Details**—Wing inboard sections have 3 deg. dihedral, outer panels 7 deg. Wing has single main spar and two auxiliary spars.

Inboard panels each house a 108-gal.

CONSOLIDATED VULTEE PHOTO

## Fokker S.14 Jet Trainer



| | |
|---|---|
| Span | 39 ft. 5 in. |
| Length | 43 ft. 8 in. |
| Height | 15 ft. 4 in. |
| Weight empty | 7,820 lb. |
| Useful loads: | |
| Two occupants, chutes | 406 lb. |
| Fuel (444 gal.) | 3,000 lb. |
| Oil | 24 lb. |
| Gross weight | 11,250 lb. |
| Wing area | 342 sq. ft. |
| Wing loading | 32.9 lb./sq. ft. |
| Power loading | 3.13 lb./lb. |
| Max. speed @ 25,000 ft. | 440 mph. |
| Max. cruise @ 25,000 ft. | 400 mph. |
| Rate of climb, s.l. | 3,500 fpm. |
| Climb to 10,000 ft | 3.3 min. |
| Climb to 30,000 ft. | 15 min. |
| Service ceiling | 40,000 ft. |
| Endurance @ 25,000 ft.: | |
| With 444 gal. | 1.2-1.8 hr. |
| With 480 gal. | 2.3 hr. |

Engine: Rolls-Royce Derwent IX—static thrust at combat rating at 14,700 rpm., 3,600 lb.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nylon fuel cell. Outboard panels each accommodate two fuel cells—one of 72 gal., the other 60 gal. Total tankage is 480 gal. Fuel is transferred from outer to inner tanks by air pressure. Submerged electrical booster pumps are used, and large panels provide access when quick change of fuel cells is necessary.

Underwing carries two dive recovery flaps.

▶**Pneumatics Used**—A pneumatic system supplied by a compressor mounted on the engine accessory gearbox operates the landing gear, flaps, wheel brakes, dive brakes and dive recovery flaps, and supplies pressure for canopy sealing. The pneumatic system panel is mounted on the bulkhead in the rear of the nosewheel bay.

Fire extinguisher system comprises two engine-mounted spray rings and three bottles mounted on the engine compartment rear bulkhead. The system is electrically operated from a button on the control panel.

Twelve flame detectors, which actuate a warning light, are located in the engine compartment.

An inertia switch is installed, which actuates the extinguisher system in event of a forced landing.

## NACA Reports

▶**Some Properties of High-Purity Sintered Wrought Molybdenum Metal at Temperatures up to 2400F (TN 2319)—by R. A. Long, K. C. Dike and H. R. Bear.**

These tests showed that commercially pure sintered wrought (as-swaged) molybdenum possessed ductility and tensile strength comparable with or higher than other proposed high-temperature materials in the temperature range between 1800 F and 2400 F. At 1800 F, the short-time tensile strength varied between 25,310 and 33,670 psi. At 2400 F, the tensile strength varied between 13,070 and 26,100 psi.

Recrystallizing lowered the tensile strength at all temperatures. Metal so treated was quite ductile at high temperatures, extremely brittle at room temperatures.—DAA

▶**A Survey of Stability Analysis Techniques for Automatically Controlled Aircraft (TN 2275)—by Arthur L. Jones and Benjamin R. Briggs.**

This survey is limited to the techniques commonly applied to linear, continuous-control systems wherein the difference between the output and input is measured continuously and is used in the operation of the system.

An evaluation of each technique is included, based on the kind and amount of derived information. And a sample calculation is presented for a typical aircraft-autopilot combination.

There is an extensive list of references and bibliographical material appended to the note. —DAA

▶**Transonic Flow Past a Wedge Profile with Detached Bow Wave—General Analytical Method and Final Calculated Results (TN 2339)—by Walter G. Vincenti and Cleo B. Wagner.**

This is the first of three papers to be published by NACA under a common general title relating to the problem of calculating the transonic flow past a wedge with detached bow wave. This note contains an outline (largely unmathematical) and discussion of the final calculated results. The same authors will present the second report dealing with the computational details. The third report will be written by Arthur E. Bryson of the California Institute of Technology, who has conducted, with Hans W. Liepmann, an experimental study paralleling the theoretical one reported here.

In the calculations, the mixed flow over the front half of the profile is determined by a relaxation solution of the small-disturbance equation in the hodograph plane. Over the rear half, the


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purely supersonic flow is found by the method of characteristics. No special assumptions are involved.

These results are found as functions of the transonic similarity parameter:
- **Bow wave and sonic line** shape and location;
- **Mach number and pressure** distribution in a chordwise direction;
- **Front wedge, rear wedge** and complete profile integrated pressure drag.

–DAA

▶ **On Reflection of Shock Waves from Boundary Layers (TN 2334)–by H. W. Liepmann, A. Roshko, and S. Dhawan.**

This report covers an experimental investigation carried out by the authors at the Guggenheim Aeronautical Lab. of the California Institute of Technology. The investigation was sponsored by and received financial assistance from the NACA.

Mach number range covered is from about 1.3 to 1.5; the Reynolds number was 900,000.

The investigation confirmed the difference in shock-wave interaction with laminar and turbulent boundary layers, a phenomenon first found in transonic flow.

The relative upstream influence of a shock wave impinging on a given boundary layer has been measured for both laminar and turbulent layers. For the laminar layer, the influence is found to be on the order of 50 boundary-layer thicknesses as compared with about five for the turbulent layer.

Separation almost always occurs in the laminar layer and is restricted to a region of finite extent upstream of the shock. In the turbulent case no separation was found.

The difference between impulse-type and step-type shock waves is discussed and their interaction with the boundary layer is compared.

The authors present some general considerations on the experimental production of shock waves from wedges and cones, and a discussion of the boundary layer in supersonic flow. They also present a few examples of the reflection of shock waves from supersonic shear layers.

–DAA

▶ **Approximate Calculation of Turbulent Boundary-Layer Development in Compressible Flow (TH 2337)–by Maurice Tucker.**

The calculations in this note are based on the selection of the arithmetic mean of the wall temperature and the stream temperature as a reference. This choice leads to a friction-drag Mach number relationship which is in substantial agreement with the extended Frankl-Voishel relationship and which is also amenable to boundary-layer calculation.

The report presents in tabular form numerical solutions of quantities appearing in the Karman momentum equation for a range of Mach numbers from 0.100 to 10. The approximate calculation of boundary-layer growth can be reduced to routine arithmetic.

The author's concluding remarks add that decisive experimental verification of the predictions is required.

–DAA

▶ **Resistance of a Delta Wing in a Supersonic Flow (TM 1283)–by E. A. Karpovich and F. I. Frankl.**

This is a translation of a note which appeared in a Russian scientific journal in 1947. It calculates the drag of a delta wing whose leading edge lies inside the Mach cone. And the calculations are performed in such a way as to separate out the term of suction drag.

The analysis is limited to small angles of attack.

As a sidelight, the early interest of the Russians in the delta-winged geometry is evidenced not only by this note. One of the references is to a paper on the lift forces on delta wings credited to M. I. Gurevich, aerodynamicist and half of the famous design team of Mikoyan and Gurevich.

–DAA


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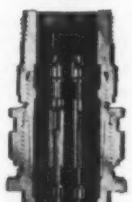

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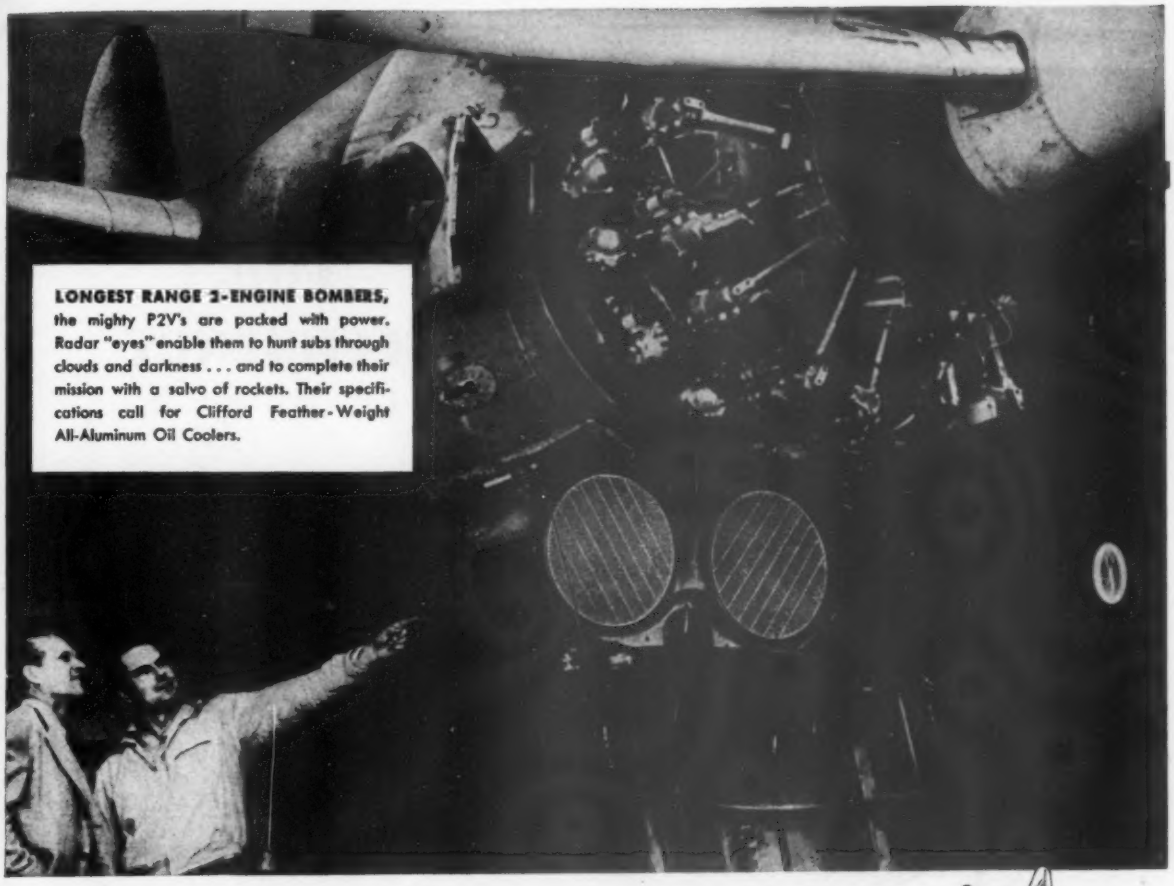

**LONGEST RANGE 2-ENGINE BOMBERS,** the mighty P2V's are packed with power. Radar "eyes" enable them to hunt subs through clouds and darkness . . . and to complete their mission with a salvo of rockets. Their specifications call for Clifford Feather-Weight All-Aluminum Oil Coolers.

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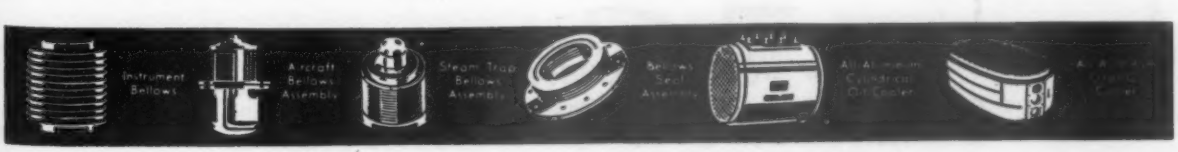

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Stratos has designed and placed in production a series of highly efficient refrigeration units with cabin air flows ranging from 10 lbs/min to 100 lbs/min. In many thousands of hours of service this equipment has earned an enviable reputation for reliability and long service life.

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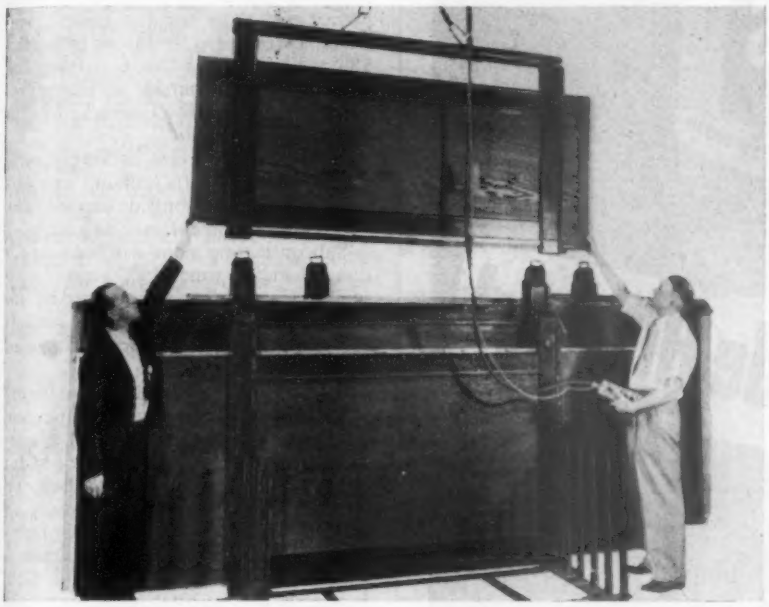

# Library Stocks Sheet Metal 'Books'

Sheet metal storage at Pratt & Whitney Aircraft has gone highbrow.

The engine builder is stacking this flat stock as "books" in a novel "library" arrangement that indicates a 90 percent reduction in material handling time and a 50 percent saving in floor area over the previous storage method.

▶**Difficulties**—Sheet metal storage for a high rate production program can be a troublesome problem. Flat-stacking of hundreds of thousands of pounds of material take up a lot of floor space. And P&W's jet engine production calls for a wide variety of sheet composition, sizes and thicknesses.

There are 14 grades of alloy steel, 11 aluminum alloys and Nimonic material. These encompass gauges from .018 to .25 in. The gauge-composition-size factors give a total of 355 different combinations.

The complexity of the sheet stocking arrangement gave P&W's Herve A. Lessard, East Hartford plant supervisor of intra-plant material movement, some ideas for radical simplification.

▶**Book Plan**—He came up with a scheme for stacking the sheets vertically as units (pages) in a package (book) filed in a storage arrangement (bookcase) that accommodates 475 stacks each holding a maximum of 1,500 lb.

Here's how the plan works: When a new crate of sheet metal comes into the plant it is placed on a steel transfer rack by an overhead crane. The crate top is removed, and one of the steel-reinforced heavy plywood book covers is substituted, hooked to a steel channel that serves as the book hinge (binding).

The rack-cover-hinge-crate combination is then turned over with the aid of the crane, and the rack removed. Next, off comes the balance of the shipping crate and the second cover attached to the hinge. Then comes transfer to a welded steel vertical storage rack until the material is needed.

▶**Easy Handling**—For easy extraction of test samples, the book is crane-hoisted from the storage facility and placed in a V-rack with sides at an angle of 70 deg. This permits the covers to be opened sufficiently for easy removal of a sheet that's needed.

When a batch of the sheet is required at a shear or press, the complete book is transported and any remaining material is returned to storage between the covers.

In addition to the benefits of manhour and space savings, this power-handled vertical storage method minimizes sheet surface scratches usually incurred when stock, stored flat, is stacked and restacked in obtaining the required units.

Acme Tank & Welding division, United Tool & Die Co., Inc., Hartford, Conn., has been authorized by P&W's Lessard to manufacture the system.


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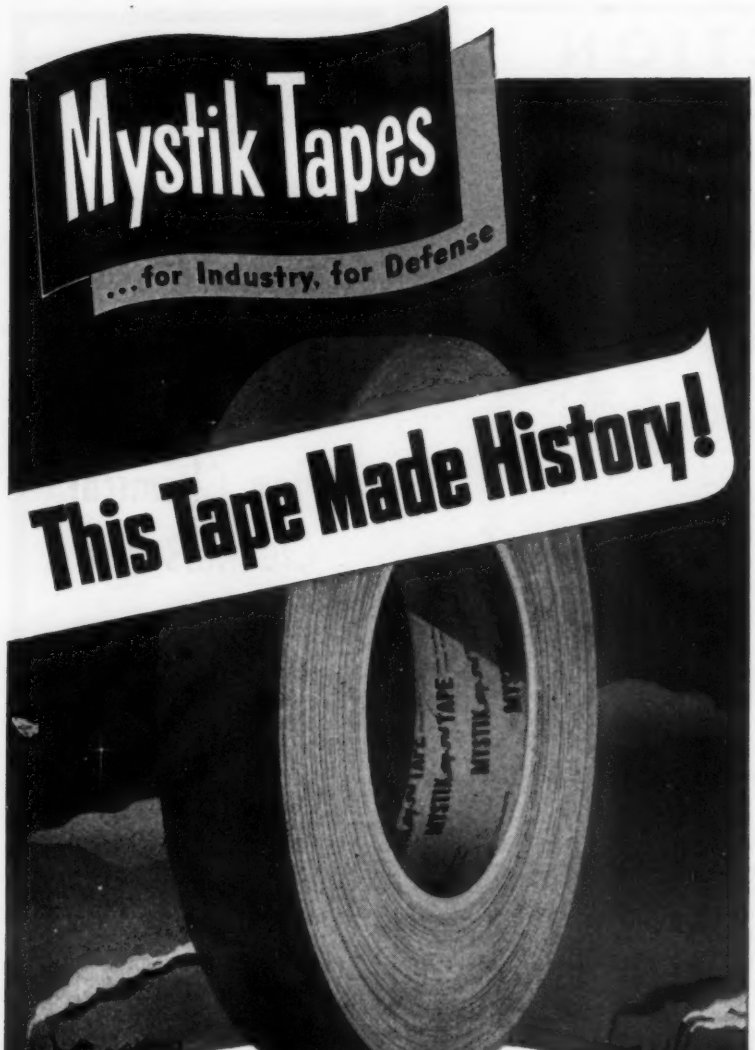


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## Martin Subcontracts Rising Sharply

Subcontractors, suppliers and vendors, particularly those on the eastern seaboard, are expected to reap an estimated $88 million harvest this year from the rapidly expanding outside purchases program underway at the Glenn L. Martin Co., Baltimore, Md.

A continually swelling backlog, now at approximately $400 million, explains the vastly increased outside expenditure, which is 112 percent over last year.

Subcontracting alone will account for more than ten times 1950's purchases, some $52 million being earmarked for this purpose, with much of the aircraft components and equipment scheduled for deliveries next year.

Typical survey of Martin's purchasing resources show that the Atlantic seaboard states are heavily favored, mainly because of their proximity—a key factor in outside buying. Maryland itself has about 850 sources, with practically all located in or near Baltimore; New Jersey and New York each have 600; Pennsylvania has 400; Ohio, 600; and California, 400. The total figure, counting smaller numbers in other states, comes to 3,865. Two-thirds of Martin's business will go to firms employing less than 500 workers.

How these small business concerns grow as a result of the company's program is exemplified by one Delaware firm which so far has received $700,000 in commitments and is getting an additional $600,000 worth of business. This organization as a result has expanded its roster of personnel from 150 workers to 425.

Glenn L. Martin at present is working on substantial USAF contracts for a night intruder version of the British Canberra jet bomber, the P5M-1 Marlin flying boat for the Navy, approximately 100 4-0-4 airliners, and classified missile projects.

## Start 'Cafeteria Style' USAF Tool Selection

Air Force contractors now can go to the Marietta, Ga., and Omaha, Neb., machine tool storage sites to select personally the tools they need to fulfill defense contracts.

The new "cafeteria-style" plan has been initiated by Air Materiel Command to speed delivery of critically-needed tooling and provide greater accuracy in selection. Up to now manufacturers ordered their requirements from the pool from stock record cards with few opportunities for on-the-spot choosing.

Here's how to get the tools you need:

• To begin with, you have to be a bona

fide USAF contractor now. You must have a facilities contract. You must have an actual need or requirement for the tools you ask for.

• The contractor has to be scheduled to visit the storage sites. This can be readily done by contacting the Industrial Equipment Section, Production Resources division, Air Materiel Command, U-B Building, Fourth and Main Streets, Dayton, Ohio. Attention MCPBXE.

• After selection of tools, shipping instructions will be issued from the Industrial Equipment Section of Headquarters, Air Materiel Command, provided the contractor's requirements are in line with his production needs. After approval, the tools will be shipped out of the storage centers as fast as local crews can get them aboard trains, trucks or the contractors' own conveyances.

Industrial Equipment Section has been housekeeper of several billions of dollars worth of high production machine tools at the two sites since the end of World War II. The machinery has been carefully preserved in an "as is" condition.

## Welds Tip Tanks

An automatic welding process is cutting the time for wingtip tank fabrication at Republic Aviation Corp.

The method is a changeover from a hand-welding procedure on the 230-gal. unit which was altered to incorporate a heavier flange for a tighter seal. Difficulties were encountered because of the small tank radius, long length, lack of temperature control, warp, and weld porosity.

Company engineers designed a welding tool specially for the tip tank job. Essentially, it is a carriage-mounted torch moved by a chain pull and covers 30 in./min. No rod is used—the tank flange edges being fused for the desired bead. Warping is well below minimum. Operator training time also is low.

## Bendix Subcontracts Over $33 Million

Small business firms (500 employes or less) have averaged over $1 million monthly in subcontracts over the past ten months from Bendix Radio division of Bendix Aviation Corp., with their share accounting for more than one-third of the over $33 million worth of rapidly expanding electronics work subcontracted during the period by Bendix Radio.

Among its plans for further expansion, Bendix Radio's subcontracting section has already compiled complete reference data on nearly 3,000 firms in addition to its present subcontractors. The present program enlists the services of 72 major subcontractors who make complete units designated by armed forces type numbers; 150 firms making special components to Bendix drawings and specifications; and about 400 who supply generally standard parts such as tubes, resistors, coils and jacks.

Bendix Radio division is located in Baltimore, Md. Its subcontracting section is headed up by Robert E. Wine, who works in conjunction with director of purchases John L. Winchester.

## Boeing Plane Spares About $190 Million

Boeing's airplane spare parts contracts with alloted funds have climbed to an impressive $190 million for the Seattle and Wichita plants. Military spares shipments this year are expected to reach $80 million, as gainst $31 million in 1950.

Greatly accelerated use of USAF planes because of the Korean conflict has been the key factor in spare parts business zooming. Commercial plane spares to be shipped by the company this year will total some $1.5 million.

It's easy to see how big this angle is, when there are some 70,000 to 75,000


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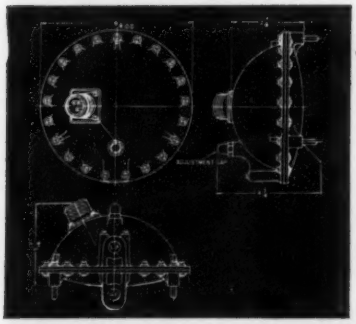
Greater safety for your planes is the goal of every Aerotec designed control. To cover every possible contingency, our instrument specialists have developed hundreds of different types of controls. Below are a few typical examples of Aerotec pressure switches covering a host of applications. Aerotec is supplying thousands of controls of these types to meet today's demands. They are playing an important part in raising the high standards of safety on commercial and military aircraft.



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*Differential Type* for Ram Air
*Sensitivity:* $\frac{1}{10}$" $H_2O$
*Actuating Pressure Range:* 1.50" $H_2O$ to 3 psi with differential of 20% of applied pressure
*Electrical Rating:* 28 VDC 5 Amp. inductive
*Complies with* A.F. environmental specification 41065-B
For stall and flap warning applications and as safety switch for cabin de-icing heaters.

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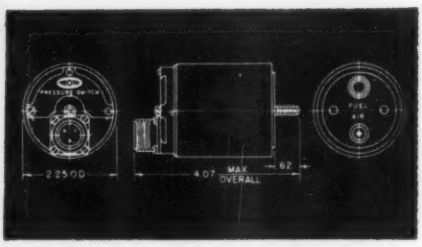
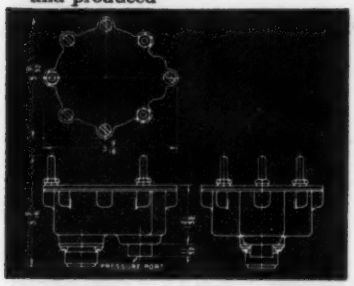
*Complies with* A.F. environmental specification 41065-B
Over 80 different types designed and produced





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*Mediums:* MIL Fuels, air, hydraulic fluids
*Electrical Rating:* 28 VDC 5 Amp. to 45,000 ft.
*Temperature Range:* −65° F. to +170° F.
*Proof Pressures* up to 7500 psi

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parts, excluding engines, on one airplane —with about 5,000 of these constituting active spare parts items. Even on inactive Boeing planes, the company is supplying some 25,000 different spares.

On the supply list are the famed World War II B-17 Flying Fortress, the more recent B-29 Superfortress, and the B-50 Stratocruiser, Stratofreighter and the sweptwing B-47 Stratojet.

Boeing's spares contracts do not include the upcoming multi-jet XB-52 now being built at Seattle.

## OUR EXPANDING INDUSTRY

**Ryan Aeronautical Corp.**, San Diego, has received $8 million in new orders for jet engine components, boosting its backlog to over $40 million. . .

**Boeing Airplane Co.**, Seattle, is moving its experimental department to Renton. The move, involving about 2,500 employes, will boost Renton payrolls to nearly 9,000. A new $200,000 anodizing installation has been placed in operation at Renton to accommodate the new load of experimental work. . .

**Bellanca Aircraft Corp.**, New Castle, Del., has been granted contracts by Glenn L. Martin to build P5M-1 Marlin flying boat fins, rudders and rudder tabs, with first completed component scheduled for delivery late this year. . .

**LaPointe Plascomold Corp.**, Windsor Locks, Conn., has entered the aviation field with purchase of the Sculli Machine Co., E. Hartford, which has been engaged in making parts for United Aircraft divisions. The Sculli acquisition will be operated as the Aircraft division of LaPointe. . .

**Jack & Heintz**, Cleveland, Ohio, received Air Force-Navy facilities contracts enabling a $3.5-million expansion in tools and equipment. More than two-thirds of the tools will come from the services; about one-third of the added facilities will be located in the plants of two major J&H subcontractors, Universal Wire Spring Co., Cleveland, and Evinrude division of Outboard Marine & Mfg., Co., Milwaukee. In addition, J&H is undertaking an extensive subcontracting program, involving about $500,000 with Apex Electrical Co., Cleveland, and Whirlpool Corp., St. Joseph, Mich.

▶ **Aircraft Armaments, Inc.**, Baltimore, has been awarded two contracts by the 3151 Electronics Group, Griffiss AFB, Rome, N. Y., for development and manufacture of airborne beacons and other radar equipment. Backlog of the company is now about $1 million.

# Why no grass grows under this mower maker's feet!

JACOBSEN LAWN QUEEN

Jacobsen Manufacturing Company, pioneer builder of power mowers, is located at Racine, Wisconsin, far from its affiliates — Worthington Mower Company, Stroudsburg, Pennsylvania, and Johnston Lawn Mower Corporation, Ottumwa, Iowa. In *time*, however, all three concerns are close. Each has a Beechcraft Bonanza. This means that Mr. O. T. Jacobsen, President, and officials of the affiliated companies can meet at Racine, return home with no time lost. Sales trips have more "sales" and less "trip." These Bonanzas are in the air almost daily, helping "expedite" government defense work and civilian production alike.

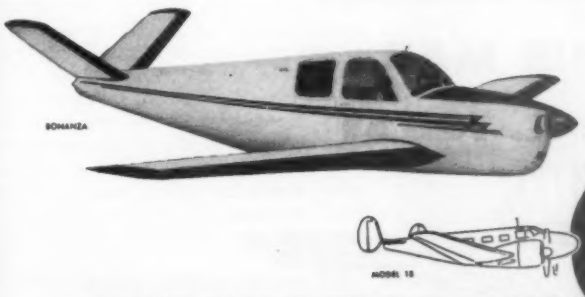
## Compare these great C35 Bonanza features

**Economy:** When cruising, you use only 65% of available engine power. This results in longer engine life, lower operating and maintenance costs. Cruising-speed fuel consumption 9½ gallons per hour—a remarkable engineering achievement.

**High performance:** All-metal continuously variable pitch Beechcraft propeller has 85% efficiency — top range for its class. Take-off rating 205 h.p. at 2,600 rpm. Means even better short field performance, rate of climb of 1,100 fpm.

**Unsurpassed safety:** Now standard on C-35—Beechcraft Hi-Strength Safety Harness. New freedom of movement, unsurpassed protection. For added comfort, rear seat is two-position, with headrest. New fresh air intake increases ventilation.

For more news of this feature-packed business plane, contact your Beechcraft Distributor, or write Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

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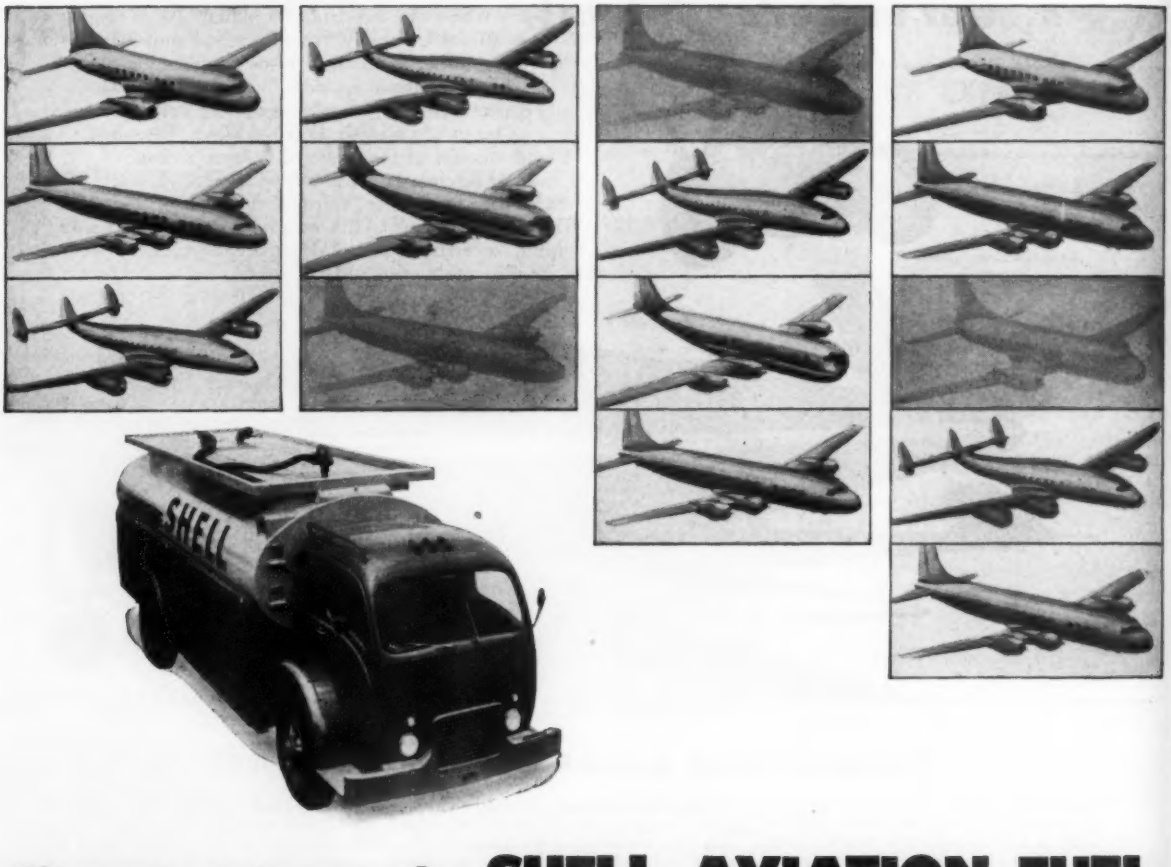


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# CB System Slated in Convair 340

**Advantages claimed for engine fire fighting include lower weight, greater effectiveness than $CO_2$.**

By Scott H. Reiniger

First airline aircraft equipped with a fire fighting system employing CB fluid as the extinguishing agent probably will be the twin-engine Convair 340.

Consolidated Vultee Aircraft Corp. told AVIATION WEEK it has specified the use of CB for protection of the 340's engines. Both United Air Lines, with an order for 40 of these planes, and Braniff Airways, which has ordered 20, have approved use of CB, Convair reports.

Deliveries of the 340, now in the final mockup stage, are scheduled to start next March. Including smaller orders from such airlines as Delta (10), Mid-Continent (6), Hawaiian (6), Continental (7), Northeast (4), the Finnish airline, Aero O/Y (3), and miscellaneous orders from oil companies and other firms, Consolidated to date has orders for 102 of these craft.

Presumably, all or most will be equipped with CB engine fire extinguishing systems, following the lead of the largest purchasers.

▶**AF Precedent**—CB extinguishing agent, or bromochloromethane ($CH_2ClBr$), replaces $CO_2$ extinguishing fluid, which already has bowed out in favor of CB in Air Force plane engines. $CO_2$ still is standard for airline craft so the CB system in the 340 still has to hurdle Civil Aeronautics Administration approval. CB is a German development, modified after considerable research, primarily by the Air Force.

CB is a weight saver. Pound for pound, it is a great deal more effective in putting out fires than $CO_2$, engineers say. This permits Convair to install an engine fire extinguishing system which is about 50 percent lighter in weight than a $CO_2$ system of equal effectiveness. The weight saving should be about 80-90 lb., according to Walter Kidde & Co., Inc., which will supply the equipment to carry CB in the 340.

▶**Advantages**—Generally, here is what engineers close to CB development list as advantages of the product:

- **CB provides additional safety** over $CO_2$ at less weight. The engineers claim equal effectiveness with a weight reduction of 35-50%.
- **More effective delivery** at low temperatures than $CO_2$.
- **Requires only 400 psi.** pressurization compared to 850 psi. in $CO_2$ systems.
- **Reduces the size of fittings** and tubing in the system considerably, according to Kidde.
- **Comparable to methyl bromide** in extinguishing ability and can be used in methyl bromide equipment now employed by the Navy.
- **Considerably less toxic** in the natural, unheated state than methyl bromide—slightly more toxic than carbon tetrachloride.

▶**Disadvantages**—Some counts against CB could be that it has never shown itself superior to methyl bromide in extinguishing ability, according to some engineers, while methyl bromide in some instances has shown itself superior to CB. Also, methyl bromide is produced in greater quantities and costs less.

The CAA regards both methyl bromide and CB as more effective in putting out engine fires than $CO_2$.

Barring development of complications in the Civil Aeronautics Administration tests of the CB fluid now being conducted at Indianapolis, a CAA engineer close to the project indicated that the agency would approve the use of the CB extinguishing system in the Convair 340.

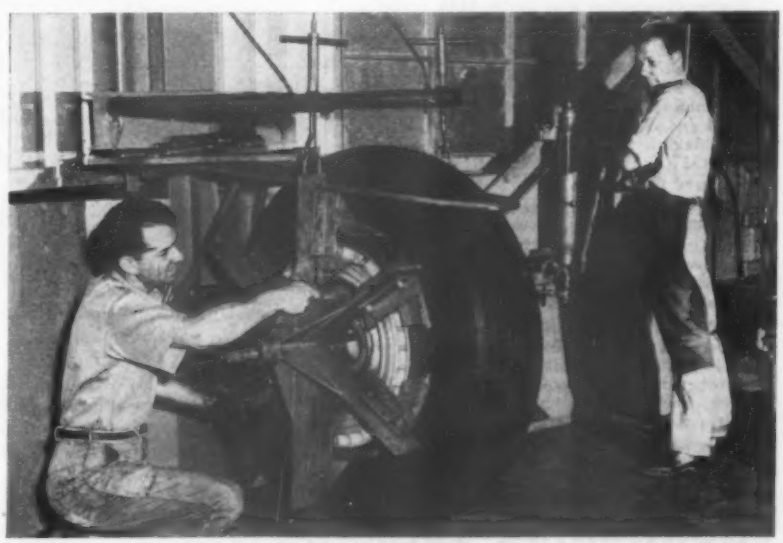
▶**340 System**—The new system planned for the 340 will have two steel bottles located in the left wing fillet, each carrying 22. 5 lb. of CB agent. This centralized arrangement will provide two-shot protection for either engine. The containers will be charged by nitrogen to a pressure of 400 psi.

Two tees, each with a double check valve are provided in the lines to the engines to prevent flow of CB from its own tank into the mating tank. The line carrying the fluid is only 1 in., compared to 1½ in. line used in $CO_2$ systems.

Stainless steel line probably will be used in the engine section, but the material to be used outside this area is still under discussion. The Air Force uses aluminum alloy tubing in areas other than the engine section. CB will not be used in the 340 for extinguishing fires in the fuselage, Convair points out.

An interesting possibility of CB, according to Kidde engineers, is that an aircraft could be fitted with an independent CB system, consisting of a supply tank in each nacelle linked by crossfeed for reserve protection, at less weight than present centralized $CO_2$ systems.

While the Convair 340 may be the first production plane equipped with CB intended for airline use, it will not be the first civil plane thus equipped. Esso Shipping Co. already is modifying some of its private air fleet to CB. For added safety, Esso's planes will be equipped with systems carrying 500 percent more CB than the minimum required for airline transports, according to Col. E. W. Estelle, manager of the firm's aviation division.



**YANKS TIRES**

**Eastern Air Lines' home-made tire-puller simplifies removal of large and cumbersome rubber at its main overhaul base in Miami. Unit closely resembles tire-puller developed by Dixie Tallyho, Inc. (Aviation Week, Mar. 5).**

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**AN5540-1** 18 MM. iron-constantan Sparkplug-gasket type thermocouple for measuring cylinder-head temperatures. Also available in copper-constantan and in 14 MM size for either material.

**AN5540-2** Iron Constantan Sparkplug-gasket type with copper ring for 18 MM plugs. Wire guard and supporting bracket are stainless steel and conductors are protected with flexible heat-resistant sleeving. AN5539 terminals are silver-soldered to leads.

**AN5541-1** Iron Constantan Bayonet Type thermocouple with junction located in silver tip. Spring used with this thermocouple will retain its strength despite high temperatures.

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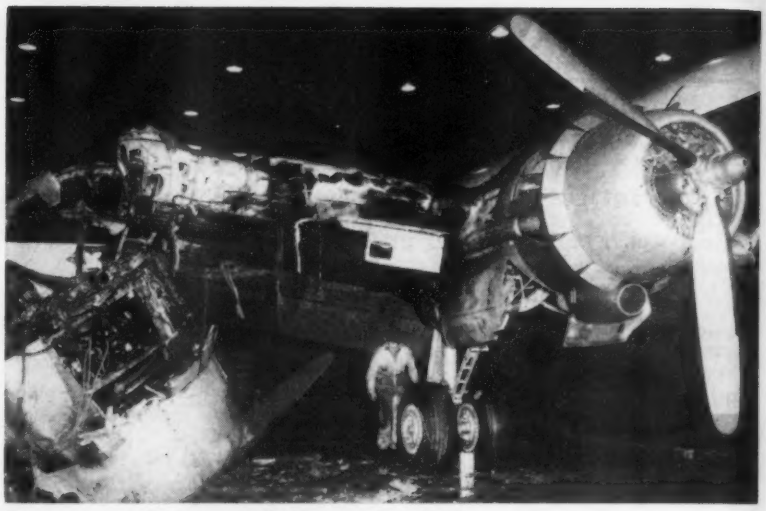

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## *. . . To a Remodeled C-54E*

Fuel was dripping from #4 engine into a bucket. A nearby electrical line shorted. Sixty-foot flames melted off the engine, consumed the outboard wing and seared the fuselage. California Eastern's DC-4 was so badly needed for the Tokyo Airlift that the company decided to repair it. Four and a half months and 35,000 man hours later, the ship was flying again. It had also been converted from an "A" to an "E" model aircraft, giving it greater fuel capacity and range. Robert E. Caskey, vice president and director of CEA believes the conversion is "the largest structural repair ever undertaken by any maintenance company or factory on this type of large aircraft."

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A new line of spark-enclosed gasoline fork trucks, designed to operate with maximum safety in gas and dust laden areas in hangars and around aircraft are now available from the Yale & Towne Mfg. Co., Philadelphia, Pa.

Salient features of the equipment:

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• Leak-tight metal air horn connects carburetor directly to a back-fire arrestor type air cleaner.

• Water jacket on exhaust manifold keeps exhaust system and engine temperatures low. Water spray in the muffler quenches sparks.

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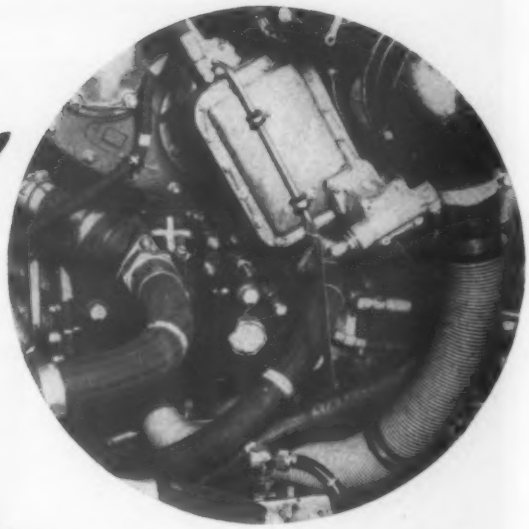

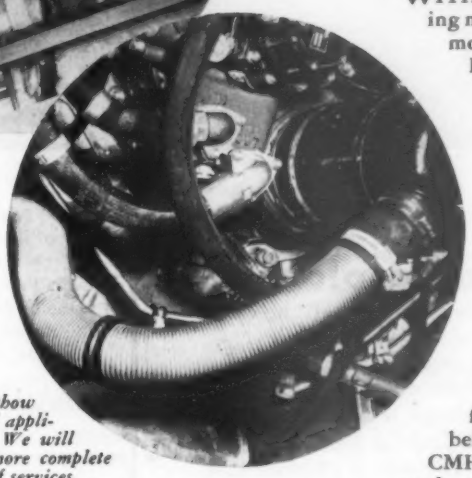

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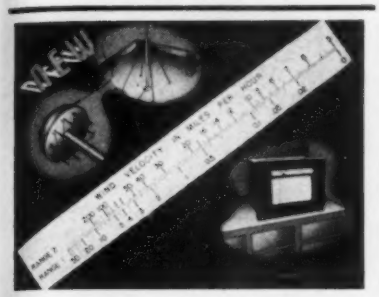

## Weather, Lab Aid

A compact wind velocity recorder for weather stations and research work which provides both instantaneous indication and a strip chart record of velocities between zero and 200 mph. has been announced by Hastings Instrument Co., Inc.

All facilities of this equipment, with the exception of the pickup head, are pressed into a single, rugged unit. It is a dual range instrument; Range One, from zero to 50 mph.; Range Two, from five to 200 mph. Velocity indications are made by a pen moving over a logarithmic scale.

Range 1 uses about eight in. of travel on the chart and is wide open and easily read up thorough five mph., according to Hastings. Range Two uses about seven in. of travel. For maximum accuracy and readibility, velocities between five and 50 mph. are read on the expanded scale of Range Two. Switching from one range to another can be accomplished manually or automatically.

Either a directional or horizontally non-directional probe (thermopile-type) can be supplied. The set operates on 110v. a-c., 60c current and voltage regulation is provided. Address: Super Highway and Pine Ave., Hampton 10, Va.

## Fitting Saves Time

A new time-saver is a quick-disconnect fitting designed to speed installation and servicing of aircraft accessories operating with flexible shafting.

Developed by Lear, Inc., the fitting already has been put into use by that company with its Model 150 Series power units and Model 568A screwjacks. According to Lear, actual field tests have shown a saving of almost three hours in the installation of an eight-screwjack system with the new fittings.

An important application of these screwjacks is in Lear's icing screen retraction system for use with jet engines. This consists of a power unit, eight screwjacks and flexible shafting as re-


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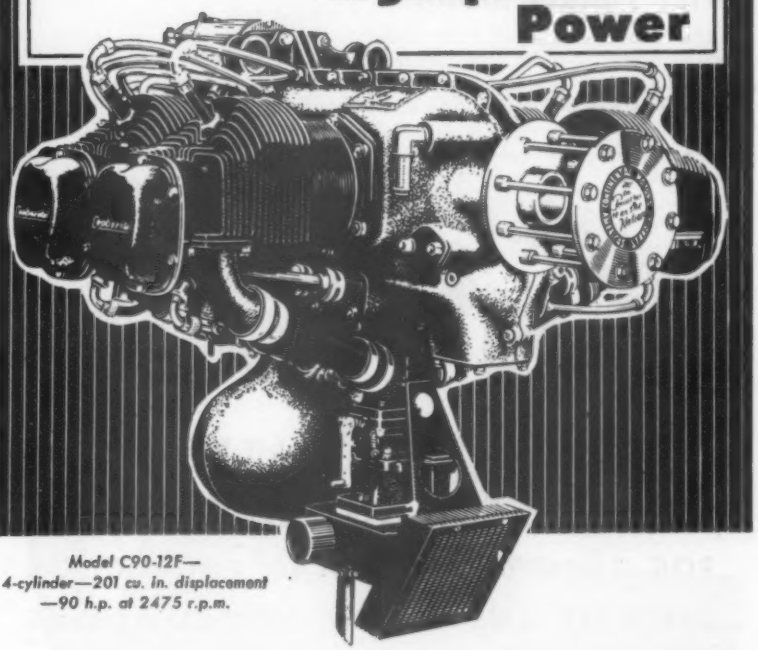

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The more importance you attach to the factor of dependability, the wiser you'll be to fly a plane with Continental power. For Continental Motors not only pioneered in building engines for light aircraft, but has been at the very forefront in their development over the past 20 years.

During this period, Continental-powered planes have established record after record, not in one or two phases of performance only, but in all. They have traveled faster, flown farther without refueling, and — still more important as proof of inbuilt stamina — have three times set amazing new marks for nonstop flight.

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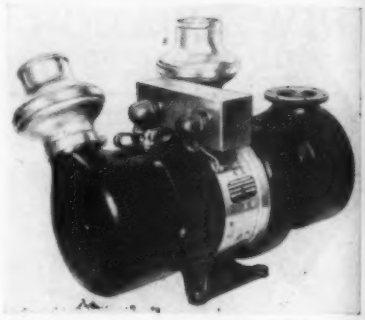
quired. The system normally is installed in the periphery of the engine air inlet section so connection can be made to the inlet screens. The entire assembly weighs less than 13 lb. (based on an assembly now in production for one manufacturer), says Lear. Address: 110 Ionia Ave. N. W., Grand Rapids 2, Mich.

## Aerial Tanker Motor

Special precautions against fire and explosion during in-flight refueling are taken in a new fuel booster pump motor reportedly in use on Boeing airborne tankers.

The 9.5-hp. motor incorporates specially designed flame arrestors at the air inlet and air outlet ventilating ducts of the unit. If an explosion occurs within the motor chamber, the resulting flame is supposed to be completely confined in that area by the arrestors, while the explosive force—minus flame—is dissipated harmlessly through the arrestors and ducts. The equipment, designated Model DA15, is being produced by Jack & Heintz, Inc.

The unit is protected against overheating caused by operating above peak specified loads or by a locked rotor. A thermal protector, motivated by both ambient temperature and current, operates a motor contactor, protecting the motor for five hr. with the rotor locked and drawing 2500 amp. or against loads exceeding ultimate trip setting.



The unit has an armature conductor welded to the commutator, radio filter and special housing that allows the pump to be integral with the motor. It is self-cooled for continuous duty up to 25,000 ft. altitude. Address: 17600 Broadway, Cleveland.

## Tougher Compound

Reformulation of synthetic rubber O-ring Compound 41 by the Parker Appliance Co. has raised the high temperature resistance of this material almost 100 percent, the firm reports.

The improved formulation will withstand temperatures from −65 to 300F. It formerly was rated at −65 to 165F. Extension of the high temperature resistance of Compound 41 has not affected flexibility at −65F, says Parker.

Development was carried out in response to specific requirements of the Wright Field Power Plant Laboratory and aircraft engine manufacturers, it reports. The material is resistant to aircraft engine oils AN-VVO-446 grade 1120, AN-0-8, SAE 40, 50, 60 oils, and similar fluids. Other properties include Shore A hardness of 65 deg., elongation of 350 percent and tensile strength of 2135 psi. Address: 17325 Euclid Ave., Cleveland 12.

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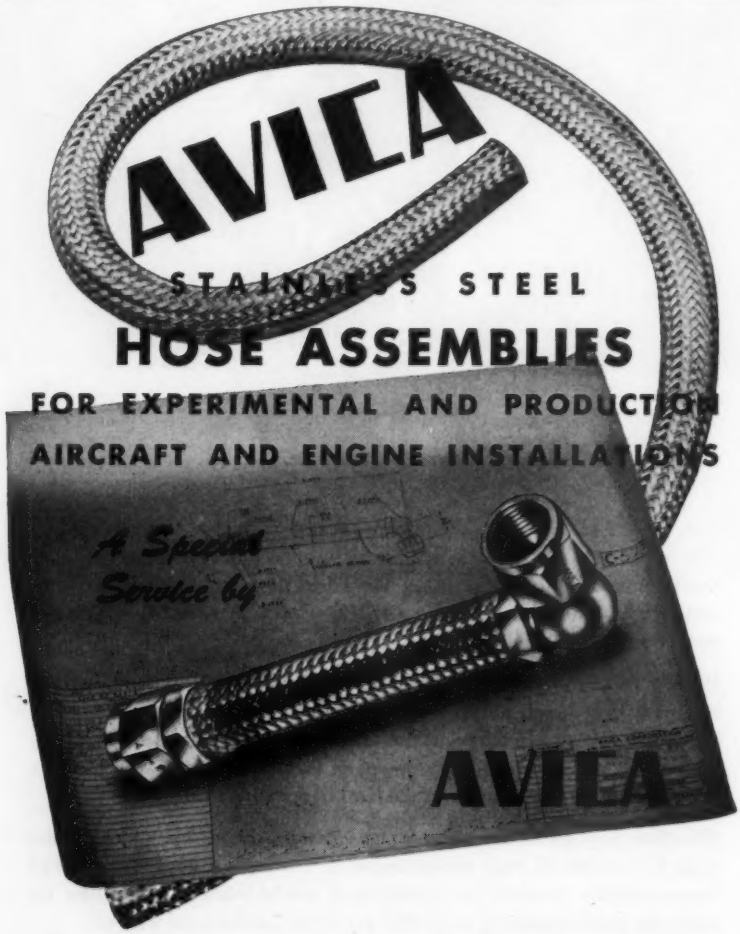
**Kling Felt** with pressure-sensitive adhesive backing can be used for rattle and squeak deadening, sealing, insulating and shock cushioning. Finger pressure installs this reinforced felt. Made by Products Research Co., 5426 San Fernando Rd., Glendale 3, Calif.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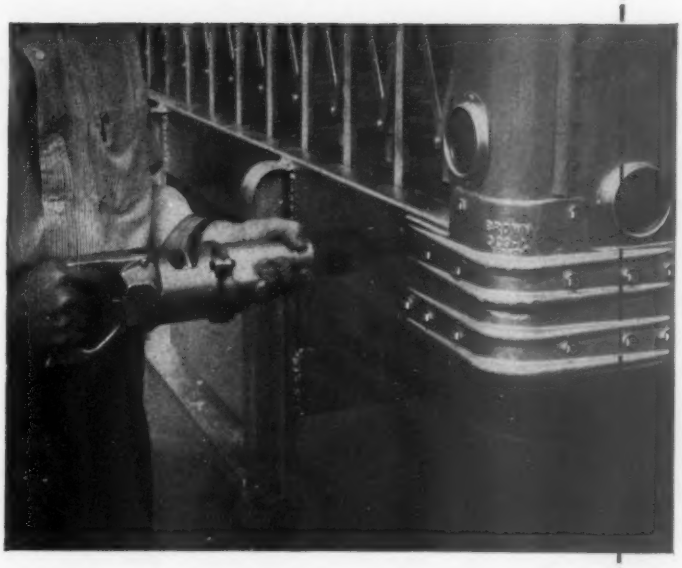

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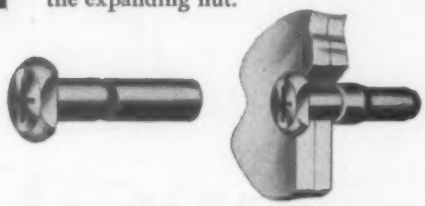
## *you can speed heavy sheet metal assembly*

**Basically a blind mechanical rivet, the Blind Bolt saves you time and expense in production or maintenance. A three-piece assembly, the Blind Bolt consists of a hollow rivet, an inner screw and the expanding nut.**



To install the Blind Bolt an inexpensive Cherry adapter tip is engaged to an automatic screw driver. This adapter tip fits the recess in the screw head of each Blind Bolt. Operation of the tool rotates the screw. The expanding nut is drawn over the rivet shank until it butts against the blind side of the job. When the sheets are drawn tightly together, the screw driver releases automatically at the pre-set torque, leaving the Blind Bolt securely installed.

## *install blind bolts and save time*

You can save time with Blind Bolts because they're installed from one side of the job... that makes it easier to handle heavy sheet metal assemblies. Blind Bolts have the shear and tensile strength you need and install fast. After two or three Blind Bolts align the job, it's only a matter of seconds to finish up. Write for complete literature today.

**FIRST... look to Cherry Rivet Company's complete line of blind rivets and high strength structural bolts.**

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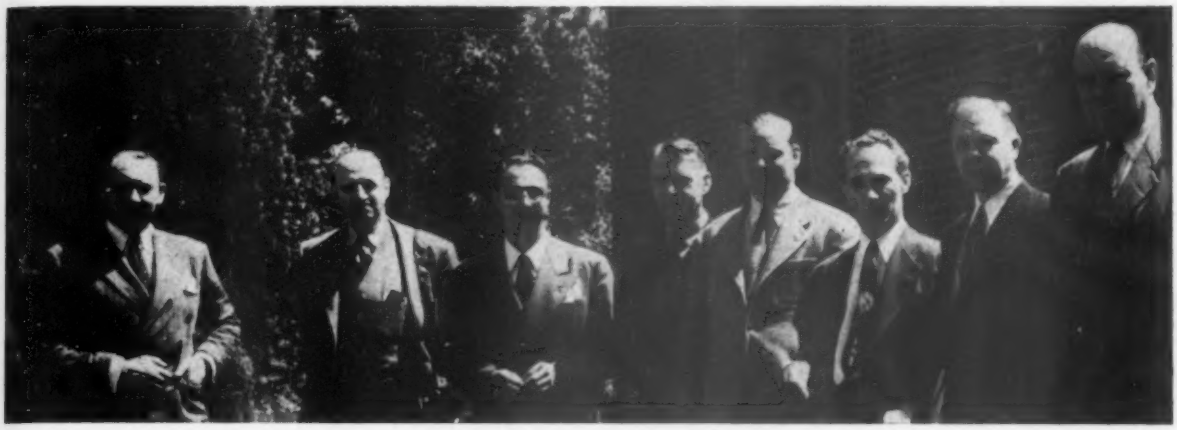


**CAA PROTOTYPE SURVEY GROUP** is pictured with two British hosts, at the de Havilland Aircraft guest house, during tour of British aircraft plants. Left to right: Frank Lloyd, de Havilland; Otto Kirchner, American Airlines; Ken Gordon, Boeing Airplane Co.; Don Rolinson, British Ministry of Civil Aviation; Capt. William Moss of Pan American World Airways, Air Line Pilots' Assn.; Ray Small, General Electric Corp.; Harold Hoekstra, CAA, chairman, and Col. Ted Enter, Defense Dept.

# We Can Catch British Jets, Group Says

**But time is running out if we are to overcome English headstart in transports, returned specialists warn.**

By Alexander McSurely

It is high time to start cutting metal on some U. S. advanced jet transport prototype planes before the British stretch their lead in this field so far it cannot be overcome.

That is the warning of six American government and industry aircraft and airline specialists who have just returned from a look at new European transport developments.

The American prototype survey group reports that the British aircraft industry now has a 3-to-5 year advantage over the U. S. in experience on jet planes already built and now in flight test programs.

▶ **British Lead**—"During 1952," the survey group has reported to CAA's Prototype Aircraft Advisory Committee, "the impact of the British lead will start to be felt by U. S. international airline operators."

Trans-Atlantic jet transport operations with British equipment may be a reality two or three years later, some members of the group predict.

The survey group also reported that there appears to be no turbine-powered aircraft available in the near future which will be able to provide nonstop service between New York and London or New York and Paris, and recommends that range of the jet prototype proposed by the advisory committee be increased, apparently to meet this requirement.

The six-man group included representatives of U. S. aircraft and engine and airline companies, an airline captain with long international flight experience, and two government officials. These are the men: Ken Gordon, Boeing; Ray Small, General Electric; Otto Kirchner, American Airlines; Capt. William Moss, Pan American pilot representing Air Line Pilots Assn.

Harold Hoekstra, CAA chief engineer, and secretary of PAAC, was chairman of the group and Col. Ted Enter, Defense Department, deputy chairman.

▶ **The Contenders**—Three major transport airplanes currently in production in quantity in Britain are seen as the immediate contenders against which U. S. aircraft manufacturers will have to compete:

• **Vickers Viscount 700**, a turboprop 40-place middle-distance four-engine plane, powered with four advanced Rolls-Royce Darts (each rated at 1,400 shaft hp. plus 295 lb. of jet thrust).

• **De Havilland Comet**, highly publicized 4-jet, 48-place, sweptwing craft. It falls short of trans-Atlantic range in its present configuration, but with Rolls-Royce Avons, as a Mark II airplane, may be able to take on the world's blue ribbon transport route, London-N.Y.

• **Bristol 175** turboprop transport, a 92-place four-engine plane, described by some of the American observers as capable of carrying the same load over the same distance as the American Boeing piston-engine Stratocruiser at a speed approximately 100 knots faster. (Prototype of this plane had not yet flown at the time of the visit to Bristol but prototype and production versions are being built simultaneously and some estimates are the plane may get into service by 1955.)

A fourth new British plane, the 18-20 place Handley Page Marathon with four Gipsy Queen 300-hp. engines, carried the survey group around Britain, and apparently gave rise to a report from the survey group to the full committee that European feeder plane needs lie in a smaller and "more austere" type of airplane than that "covered in our specifications."

▶ **U. S. Entry**—Compared to these British types, the U. S. now has one turboprop cargo prototype flying, the Convair Turboliner, powered with two Allison turboprops—while the only U. S. jet-powered transport to fly has been the modified four-jet Chase C-123 military assault transport. At least two companies, Boeing and Lockheed are known to have shelved promising sweptwing jet transport designs due to their inability or unwillingness to take on the high development costs for flying prototypes. Costs for such a development have been estimated at from $20 to $30 million.

The returning survey group reported

that the British government had spent approximately $400 million since 1943 on its postwar civil transport development program, including prototypes of other aircraft than those mentioned above, such as the giant Bristol Brabazon, which apparently is not going into quantity production.

The survey group's report was not entirely pessimistic as regards the U. S. future in transport production.

"Our position is potentially sound insofar as technical development is concerned," the survey group reported.

"The U. S. may not have lost an irretrievable amount in competitive position on turbine-powered transports by delaying until this time if immediate steps are taken."

▶ **For Immediate Action**—This is the immediate action recommended:

• **Intensive testing** of available turbine-powered aircraft in order to obtain design, operating, airway and airport data.

• **Start development** of advanced types.

The first recommendation presumably calls for a reopening of the advisory committee's plan to run two North American four-jet B-45 bombers on a simulated airline route operated by airline pilots to gain operational experience as to holding time, engine maintenance, and other factors. Funds for this operation have not been made available by Congress. It also presumably would entail flight test work with such planes as the Convair Turboliner, and the forthcoming Douglas C-124B which will be a military transport powered with four Pratt and Whitney T-34 turboprops.

**ADAMS TO PANAM**

**Russell B. Adams has been named vice president of Pan American World Airways effective Aug. 1 to represent the airline in Washington and in international route work. Adams has been assistant to Secretary of State for airline relations and previously had served as a member of CAB.**

As to the second recommendation, the survey group, including government members, wants to get started and it doesn't care much whether it is private enterprise or government which supplies the money, the important thing they say, is to get going without further delay.

▶ **Present Chance Slight**—Realistic analysis indicates, however, that there is little chance for a non-government U. S. transport prototype program at this time.

First two U. S. operators to be affected by the British jet competition will be our international airline operators, Pan American and TWA. Domestic U. S. airlines, which represent a far larger market for new airplanes, probably will not feel the pressure of foreign jet plane competition, except in a minor way, for some time to come. There is talk of British Overseas Airways operating Comets on the New York to Bermuda route, and there may be some Canadian jet operations. But the money-making transcontinental routes can be expected to continue to give their present piston-engine plane service for some time—perhaps until the attraction of becoming the first jet plane operator induces one of the domestic companies to shift to jet equipment. Once

one shifts, the others, competitively, will probably have little alternative but to follow.

There is a serious question whether the highly competitive TWA and Pan American international operations would co-operate sufficiently to agree on a common U. S. jet transport to be financed by them jointly. This leaves government sponsorship as the most likely practical means of putting the U. S. back in the advanced transport development race.

▶ **European Picture**—Of French planes seen, the American survey group took most interest in the Breguet 763 double-decked four-engine cargo plane which was considered to have good prospects as an aerial freighter.

Gordon told AVIATION WEEK that he had made a special study of government sponsorship of plane developments in each of the countries visited: Holland, Switzerland and Sweden, besides France and England. In all except Switzerland he found some form of government subsidization of airplane development well established and in operation. In Holland the development was military, but the principles were the same, he felt. Switzerland, the exception, had no large aircraft production.

Gordon sees a direct relationship between Britain's big government expenditure and their world leadership in jet transport development.

Speaking for himself and for his company, Gordon said that he and Boeing felt that some U. S. active government sponsorship of new transport prototypes was the only way in which the present stalemate on jet development in this country would be broken.

▶ **Individual Observations**—Capt. Moss, after returning to this country, made a weekend trip to Canada to fly the Avro Jetliner for comparison with the British types. He took the controls of the Viscount during a flight, but the survey group did not get a Comet flight. Moss sees the British planes as a definite advance over current U. S. types, and advocates prompt action by the U. S. to get back into the competition. He foresees need for considerable study of holding problems with jets. Kirchner pointed out that the foreign airlines using U. S. equipment had to carry large stocks of spare parts. He thought that this, together with the favorable situation of British pounds vs. U. S. dollars, might be additional factors influencing the change of other foreign airlines to British equipment, when it became available. Moss said that the foreign airlines other than British saw delivery dates for any of the new British planes as somewhat distant, and that was why they had not made more definite commitments yet, since the British will get the first of their new planes for their own airlines.

Kirchner was much interested in new engine test stands which he saw at the SAS shop in Stockholm and at Swissair in Zurich.

A future pressurization problem seen by the American Airlines engineer is in the rate of pressurization. It is expected that the more rapid ascent of jet transports will require a more rapid pressurization to keep up with the rate of ascent, but this can only be used up to a certain point because of human limitations. The British are already advocating pressurizing cabins to the equivalent of 6,000 ft. altitude rather than 8,000 ft. as is now commonly used.

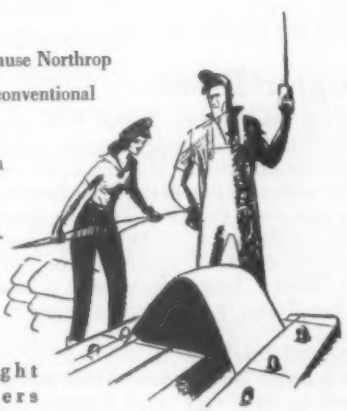
The jet engine specialist, Ray Small of General Electric reported that, overall, he considered Great Britain and the U. S. on a comparable basis as far as jet engine development is concerned, with the U. S. having an edge in production methods.

Small looked at two de Havilland Ghost engines pulled for inspection by BOAC from a Comet after 250 hr. operation. He considered them in good condition and apparently capable of another 250 hr. without any important parts replacements. He considers that the

# *from hard die plastic!*

***Here's another time-saving, cost-saving Northrop production technique:***

F-89's require fewer man-hours, less strategic material, less machine time because Northrop production engineers use simple, low-cost phenolic-resin dies in place of conventional metallic dies for forming thousands of high-strength metal parts. This technique is part of the production knowledge that delivered Black Widows on time in World War II—the same knowledge that's speeding the production of the deadly F-89 Northrop Scorpion, standard all-weather interceptor of the U. S. Air Force.



***Northrop has many new positions. Your applications invited.***

**HAWTHORNE, CALIFORNIA** Pioneer Builders of Night and All-Weather Fighters

**AA'S LADY 'VEEP'**

**Miss Carlene Roberts, recently named vice president of American Airlines, is the first woman to hold such a position in the airline industry. She joined the carrier in 1938 as secretary to an officer of the company, a year later was in charge of personnel movement from Chicago to New York, and in 1945 was made assistant vice president. Miss Roberts, who is 37, is in charge of AA's administrative office in Washington, D. C., representing the carrier in its relations with the government.**

proposed 500-hr. overhaul period which the British will use for beginning jet operations is "entirely realistic" as far as commercial operations are concerned.

The GE engineer pointed out that virtually all American jet engine operational experience has been military under frequently changing temperature conditions due to rapidly varied altitudes and throttle settings. As a result, military overhaul periods are low. He believes that any one of several American jets produced by several manufacturers could equal the longevity performance of the British Ghosts, in a similar transport operation, involving simple climb to altitude, continuous flight at altitude at relatively constant speed and gradual descent to landing.

## Copter Boost

Civil Aeronautics Board Examiner Ralph L. Wiser suggests that CAB study possibilities of the helicopter for local airline service before it authorizes any new single-engine airline operations.

Says CAB-Examiner Wiser in recommending denial of application of Roscoe Charter Service to become a local airline flying three-passenger single-engine planes in the Kanasas area: "It is suggested that prior to any decision of the board to launch a nationwide experiment to serve very small communities with such small airplanes, it would be appropriate to investigate the possibilities of the helicopter. . . ."

# International Mail Pay

U. S. carriers received $10.8 million for transporting foreign mail and foreign carriers received $2.1 million for transporting U. S. mail in 1950 fiscal year, the latest year for which data has been compiled, according to a report by the Post Office Department to the Senate Appropriations Committee.

Here are the details.

### Foreign Countries' Mail Hauled By U. S. Flag Carriers, Fiscal 1950

| CARRIER AND ROUTE | Amount Foreign Air Mail Revenue | Foreign Air Mail (Ton Miles) | Average Revenue Per Ton Mile |
|---|---|---|---|
| **American:** U. S. to Mexico | $73,836 | 41,200 | $1.7895 |
| **American Overseas:** U. S. to Europe | 1,202,260 | 564,293 | 2.1306 |
| **Braniff:** U. S. to Latin America | 30,904 | 10,778 | 2.8673 |
| **Chicago & Southern:** U. S. to Latin America | 12,149 | 6,103 | 1.9907 |
| **Colonial:** U. S. to Bermuda | 5,146 | 2,264 | 2.2730 |
| **Eastern:** U. S. to San Juan | ..... | ..... | ..... |
| **National:** U. S. to Cuba | ..... | ..... | ..... |
| **Northwest:** U. S. to Alaska, Orient, Hawaii | 409,169 | 243,923 | 1.6775 |
| **Panagra:** Canal Zone to Latin America | 706,753 | 245,705 | 2.8764 |
| **Pan American:** | | | |
| U. S. to Alaska | ..... | ..... | ..... |
| U. S. to Africa, Europe, Near East | 2,167,475 | 972,575 | 2.2286 |
| U. S. to Latin America | 1,950,897 | 714,305 | 2.7438 |
| U. S. to Orient | 1,215,779 | 571,989 | 2.1255 |
| **Trans-World:** U. S. to Europe, Near East | 3,090,478 | 1,454,273 | 2.1251 |
| **United:** U. S. to Hawaii | ..... | ..... | ..... |
| **TOTAL** | **10,873,846** | **4,827,468** | **2.2525** |

### Mail Dispatched From U. S. on Foreign-Flag Carriers, Fiscal 1950

| CARRIER AND ROUTE | Amount Paid Foreign Carriers Carriage U. S. Mail | Ton Miles U. S. Mail | Average Cost Per Ton Mile |
|---|---|---|---|
| **Air France:** Trans-Atlantic | $452,558 | 171,205 | $2.643 |
| **BOAC:** Trans-Atlantic | 571,397 | 212,461 | 2.689 |
| **KLM:** Trans-Atlantic | 199,665 | 76,255 | 2.618 |
| **Sabena:** Trans-Atlantic | 110,528 | 41,898 | 2.638 |
| **Scanair:** Trans-Atlantic | 611,048 | 259,288 | 2.356 |
| **Swissair:** Trans-Atlantic | 67,009 | 29,977 | 2.235 |
| **British Commonwealth Pacific:** Trans-Pacific | 113,308 | 39,386 | 2.876 |
| **Air France:** Latin America | 1,145 | 468 | 2.446 |
| **BSAA:** Latin America | 2,828 | 886 | 3.191 |
| **CIA:** Latin America | 299 | 121 | 2.471 |
| **Cubana:** Latin America | 1,778 | 633 | 2.808 |
| **LAV:** Latin America | 19,726 | 14,464 | 1.364 |
| **TOTAL** | **2,151,289** | **847,042** | **2.5398** |

### U. S. Mail Conveyed by U. S. International Flag Carriers, Fiscal 1950

| CARRIER AND ROUTE | Amount Paid Carrier | United States Ton Miles | Average Cost Per Ton Mile |
|---|---|---|---|
| **American:** U. S. to Mexico | $89,792 | 122,027 | $0.7358 |
| **American Overseas:** U. S. to Europe | 4,164,964 | 1,588,091 | 2.6226 |
| **Braniff:** U. S. to Latin America | 1,734,503 | 27,558 | 62.9401 |
| **Chicago & Southern:** U. S. to Latin America | 1,512,892 | 26,606 | 56.8628 |
| **Colonial:** U. S. to Bermuda | 233,983 | 7,388 | 31.6708 |
| **Eastern:** U. S. to Puerto Rico | 52,545 | 74,880 | .7017 |
| **National:** U. S. to Cuba | 57,440 | 13,492 | 4.2574 |
| **Northwest:** U. S. to Alaska, Orient, Hawaii | 5,577,827 | 2,009,030 | 2.7764 |
| **Panagra:** Canal Zone to Latin America | 3,136,489 | 342,167 | 9.1665 |
| **Pan American:** | | | |
| U. S. to Alaska | 1,327,603 | 431,380 | 3.0775 |
| U. S. to Europe, Africa, Near East | 9,677,612 | 3,037,774 | 3.1858 |
| U. S. to Latin America | 7,222,793 | 2,798,219 | 2.5812 |
| U. S. to Orient | 11,714,116 | 5,749,084 | 2.0376 |
| **Trans-World:** U. S. to Europe, Near East | 9,167,526 | 3,016,835 | 3.0391 |
| **United:** U. S. to Hawaii | 499,491 | 663,311 | .7530 |
| **TOTAL** | **56,169,576** | **19,907,551** | **2.8215** |

## SHORTLINES

▶**Air France**—New office at 1518 K St., N.W., Washington, D. C. was opened by the carrier on July 18. Premises include a 17x30-ft. theatre for showing travel films, a mezzanine and a basement.

▶**Alaska Airlines**—Plans to begin CAB-certificated service between Portland, Ore., and Seattle, Washington, and Fairbanks, Alaska, on Aug. 12. One flight daily is scheduled at first, at rate of $90 from Seattle or $97 from Portland to either Anchorage or Fairbanks, with privilege of seven-day stopover in Fairbanks. Freight rates will be 17 cents per pound.

▶**California Central Airlines**—June saw the carrier haul 13,294 passengers over 3,973,706 passenger miles. Load factor over Burbank-San Francisco segment was 83.7%; over Burbank-Inyokern 38%; and over San Francisco-San Diego 46.9%.

▶**Capital Airlines**—Air freight shipments have increased by 300% since 1946, totaling 27,519,232 lb. for 7,006,691 ton miles from July 15, 1950 through same date this year. This mark was set despite the fact that two Capital all-cargo planes were turned over to the Korean airlift at the beginning of hostilities.

▶**Colonial Airlines**—Summer tours has sharply increased passenger loads to and from Montreal, with a record 1,200 Canadian vacation plans sold in June, over 550 sold at mid-July, with a total expected for the latter month of 1705. The tours start at $99.85.

▶**Frontier Airlines**—All of the carrier's 12 DC-3s will be converted to seat 24 passengers because of heavy traffic. Frontier's passenger traffic in May was up 77% over the same month last year, and June's was running about double June, 1950. Air freight has increased over 100%.

▶**Los Angeles International Airport**—Figures for first five months of 1951 show that 656,601 passengers cleared through the airport, a 43.4% increase over the same period last year. Air cargo, including mail, freight and express, was up 36% to 16,000 tons.

▶**Northwest Airlines**—Domestic load factor in June was 81.4%, a 17.4% increase over June, 1950. NWA Orient passenger revenues were up 44.9% over June last year. Total revenue passenger

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***Engineering Personnel Manager***

**PIASECKI HELICOPTER CORP.**

**MORTON, PA.**

**A Philadelphia Suburb NEAR SWARTHMORE**


revenue was up 46.5% the first six months of 1951 over the same period last year. Air freight revenues during May climbed to $1,418,000 covering domestic, Alaska-Hawaii and Orient operations.

► **Oakland Municipal Airport**—Passenger traffic in and out of the airport was up 51% for the first six months of this year over the first half of 1950, with total being 182,985 persons for the current period. Air freight through Oakland Municipal was up 438% to 8,612,103 lb. over 1950 first half. Air express climbed 220% in the initial half of this year over the similar period last year to 867,524 lb.

► **Pan American World Airways**—Alaskan region was busiest for airline during June in 19 years of operation. The line carried 6,580 passengers, a 33.5% increase over a year ago. Cargo was up 42% to 720,227 lb., and extra sections number 37. July is expected to top June, with 39 extra sections already established. There were 23,300 passengers flown in first six months of this year.

► **Panagra**—A 27% increase in revenue passenger miles is reported by the carrier for the first six months of 1951, with the carrier flying 63,825,000 revenue passenger miles during the period.

► **Pioneer Air Lines**—Carrier transported 75,910 passengers during the first half of 1951, a 29.4% increase over the same period last year. Passenger miles were up 24.5% to 19,707,868, and pounds of mail increased 26% to 542,567 lb. Air freight and air express increased 17 and 10% respectively.

► **Railway Express Agency**—Air Express division reports that shipments flown in and out of New York City rose 3.2% between July 1-7, compared to the same period in 1950, with gross revenues gaining 62.7% for the same period. Current period shipments were 13,927 and gross revenue was $85,-845.19. Outbound shipments were 8,941 and inbound 4,986.

► **Slick Airways**—Scheduled freight carrier has opened complete terminal facilities at Idlewild International Airport, N. Y., under direction of Whitney Bowles, formerly of Philippine Air Lines. Slick will continue to base at Newark Airport, but its planes will go into Idlewild as required.

► **West Coast Airlines**—First half of 1951 showed sharp increases in revenue passengers and miles flown by the carrier, with former up 19% and latter climbing 26%. Total for the period was 36,200 passengers.


# ENGINEERS

**wanted at once**

**for**

**LONG-RANGE MILITARY AIRCRAFT PROGRAM**

**by**

**NORTH AMERICAN AVIATION, INC.**

**Los Angeles, California**

**Columbus, Ohio**

**Unusual opportunities for Aerodynamicists, Stress Engineers, Aircraft Designers and Draftsmen, and specialists in all phases of aircraft engineering. Engineering skills other than aircraft may be adaptable through paid training program. Also openings for**

**Recent Engineering College and Technological Graduates**

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**Engineering Personnel Office SECTION 3**

**NORTH AMERICAN AVIATION, INC.**

**Los Angeles International Airport**

**Los Angeles 45, Calif.**

**or**

**Columbus 16, Ohio**

## AVIATION CALENDAR

Aug. 6—International air race for the Daily Express Cup, England.

Aug. 11-19—Eighth annual Michigan aviation week, sponsored by the Aero Club of Michigan.

Aug. 15-19—Fifth annual all-woman transcontinental air race, sanctioned by the Ninety-Nines, Santa Ana, Calif., to Detroit, Mich.

Aug. 18-19—National Air Race, Detroit, Detroit-Wayne Major Airport.

Aug. 22-24—Western convention of Institute of Radio Engineers and Seventh Annual Pacific electronic exhibit.

Aug. 22-26—International convention of the Ninety-Nines, Mackinac Island, Michigan.

Aug. 23-30—1951 Pacific general meeting of the American Institute of Electrical Engineers, headquarters, Multnomah Hotel, Portland, Ore.

Aug. 24-26—Fifth annual convention of the Air Force Assn., Ambassador Hotel, Los Angeles, Calif.

Sept. 3-7—Royal Aeronautical Society-IAS third international aeronautical conference, Brighton, Sussex, England.

Sept. 10-14—Sixth national instrument conference and exhibit sponsored by the Instrument Society of America, Sam Houston Coliseum, Houston, Tex.

Sept. 10-16—Seventh annual general meeting of the International Air Transport Assn., Westminster School, London, England. Program includes one-day visit to SBAC Farnborough show.

Sept. 11-16—Twelfth flying display and exhibition of the Society of British Assn. of Constructors, Farnborough, England.

Oct. 2-4—Seventh annual aircraft spark plug and ignition conference sponsored by the Champion Spark Plug Co., at Toledo, Ohio.

Oct. 8-10—Special conference on aircraft electrical applications, sponsored by the Air transportation committee of the American Institute of Electrical Engineers and the Los Angeles section of the Institute, Hollywood Roosevelt Hotel, Hollywood, Calif.

Oct. 16-17—Fourth annual New York State conference on airport development and operation, sponsored by the N. Y. State Dept. of Commerce, N. Y. Aviation Trades Assn., Assn. of Towns of the State, Conference of Mayors, County Officers' Assn., and the N. Y. State Flying Farmers, Onondaga Hotel, Syracuse, N. Y.

Oct. 29-30—Air Industrial & Transport Assn. of Canada annual general meeting, Seigniory Club, Montebello, Quebec.

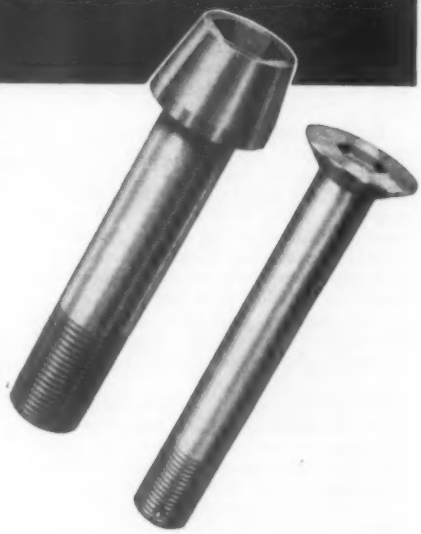
Oct. 31-Nov. 1—Society of Automatic Engineers, fuels and lubricants meeting, Drake Hotel, Chicago.

Nov. 28-30—Ninth annual meeting of the Aviation Distributors & Manufacturers Assn., Waldorf-Astoria Hotel, New York City, N. Y.

## PICTURE CREDITS

3—(F-89) Northrop Aircraft, Inc.; (Sea Hawk) Keystone; (SNCASE) Howard Levy; (Convair 340) Consolidated Vultee; 18—USAF; 21-23—Minneapolis-Honeywell Regulator Co.; 58—Wide World.


SPS AIRCRAFT FASTENERS



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# LETTERS

## 'Backward' Seats

Thanks for your editorial, "No Compromise With Safety." I hope you continue to beat this important drum for I cannot conceive of a smart airlines executive not wanting to reverse the seats—except to save money.

Backward seating is bad psychology? My eye! It's good. Just watch most passengers run for window seats already. Seat them backward and you'd double the number of view seats. They'd be looking back at the view instead of at the flexing wings, the dents in the cowling, the cherry red exhaust shrouds, oil dripping off the trailing edge, smoke on warm-up, feathered props, etc.

We regular passengers wouldn't be aboard if we thought we were going to crack up but . . . we seat ourselves aft.

G.

*(The writer's company sells to the airlines, so he has asked us to omit his name. Similar comment was addressed to Flight Safety Foundation by an airline captain: "There is another small but perhaps significant point which designers might care to bear in mind and that is that when the passenger cannot see the powerplants behind which he is flying he does not spend the major portion of his waking hours glaring at them to see if he can detect something funny about them which he feels he should point out to the steward or captain. Psychologically, this is laughable but true. I have proven it a score of times."—Ed.)*

## 'Fair and Honest'

As a subscribing airline pilot to your magazine, I want to thank you for the fair and honest manner you are reporting the current controversy between the airline pilots and the respective carriers.

It is extremely difficult for any working group to get the truth before the public. Some six years ago in the first airline strike a pilot committee was told by the Los Angeles papers to buy a page of advertisement if they had a story to tell. Your reporting is quite refreshing. We are grateful.

Little does the public realize that our working hours were established in 1933 as a maximum. With the increased speeds of planes above the DC-3, our time on duty has increased almost twice. Some of our pilots are gone from home every day in order to get eighty-five hours flying time in per month. There is one run on a major airline where the crew is on duty forty-eight hours to get six hours' flying credit. With the deterioration of working conditions, pilots are seeking other fields of endeavor, while the industry fails to induce new ones, replacements, with such poor prospects. Even the nonskeds are starting new pilots at $400 per month while the subsidized carriers refuse to pay more than $290. Hod carriers make twice that. We have had no pay increase for five years while executives have received up to 40 percent salary boost plus huge slices of a so-called incentive fund.

Management must meet their obligations to the pilots else they and the public will find a product in the cockpits not to the best interest of everyone. For years we have harkened to the plea of poverty while high salaried attorneys wrung more mail pay from the tax-payer to cover for any losses.

It is not fair or just that management should claim all the profits from technological advancement, at the expense of the men who built the industry. The traveling public has a right to expect the best that money can buy at the controls.

David B. Kuhn, Chairman
Negotiating Committee
A.L.P.A. Council 4
12694 Montana Ave.
Los Angeles 49, Calif.

## Working Together

Your photograph in the July 9 Aviation Week showing Messrs. Kulp-Waco's truck hauling the Bell X-1A to the Cornell Aeronautical Laboratory is the finest argument yet seen for all carriers to get together, instead of bickering as to who is stealing whose revenue.

H. E. Seaboyer, Jr.
Rate Dept.
Brooks Transportation
Richmond, Va.

## Engineer Shortage

We wish to use the article entitled, "Engineer Supply Low, Going Lower," which appeared May 7 in Aviation Week, in . . . papers by and for engineers, and to further their interests.

C. Ricker James, Chairman
Publications Committee
Professional Engineering
Employees Assn.
Seattle, Wash.

## Skydrol

We would like to take this opportunity to commend you on the recent article (by George Christian) on Skydrol which appeared in Aviation Week June 18. We believe the article did an excellent job of presenting the practical advantages which are being realized by operators who have adopted Skydrol for their hydraulic systems or cabin supercharger systems, while at the same time portraying realistically the problems which it has had and those which it may still face.

Our work on this subject matter over the past several years makes us even more aware of the difficulties of presenting such a subject, and even more keenly appreciative of the technical, and yet practical, structure of your article.

Our congratulations again for a good job!

D. W. Douglas, Jr., Vice President
Military Sales
Douglas Aircraft Co., Inc.
Santa Monica, Calif.

We here at Monsanto appreciate very much George Christian's excellent story, "All Big DC-6 Fleets Go to Skydrol," in the June 18 Aviation Week. It tells the story factually, which is the way we believe prospects and users of Skydrol prefer to have the information. It is the method we use in discussing it with the airlines. . .

H. F. Shattuck, Manager of Sales,
Functional Fluids
Monsanto Chemical Co.
St. Louis, Mo.

*(Monsanto has ordered 2,000 reprints of the article.—Ed.)*

## 'An Industry Service'

I have just finished reading your leading editorial ("Fishy Press Releases") in the June 25 Aviation Week and cannot help but write an immediate note of commendation for your very constructive comments.

One of the things that we prize highly is the reputation we and the other airlines have for accuracy and honesty in our press releases. We believe that the respect which the press generally has for airline news sources is an asset which we must use every care to retain. That is why I think you do the industry a service when you publish such comments as you so aptly made in your editorial.

This letter isn't written for publication—it is just a personal thanks to you for doing the industry such a favor.

An Airline Vice President*

*(* Aviation Week has omitted the writer's name—Ed.)*

Congratulations on your stand against fishy press releases. I consider this an outstanding denunciation of a greatly overworked phase of news handling.

Stewart Faulkner,
Director of Publicity
Continental Air Lines
Denver, Col.

We got quite a kick out of the editorial in the June 25 issue on fishy press releases.

Frankly, we have been plagued by what we feel have been "exaggerated claims" of some members of the aviation industry. It has sometimes led to the charge that we are entirely too conservative in our General Electric publicity operations. Perhaps we are . . .

J. S. Smith, Manager
Advertising & Sales Promotions Divisions
Apparatus Dept.
General Electric Co.
Schenectady 5, N. Y.

## He Was Busy

Please send your magazine and bill me for subscription. Reason for not renewing sooner—got married and divorced all in two months' time. Was rather busy.

S. H.
A Capital Airlines Co-pilot.

# SEARCHLIGHT SECTION

(Classified Advertising)

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*CHICAGO: 520 N. Michigan Ave. (11)*
*SAN FRANCISCO: 68 Post St. (4)*

## POSITIONS VACANT

DESIGN ENGINEER A and Design Engineer B: Responsible positions requiring three to five years experience in mechanical design of aircraft quality, preferably in gas turbines or similar type machines. Must be capable of working from design specifications in making layouts of complete parts or components including sheet metal construction, taking into consideration manufacturing costs, weight, stress, heat, material properties, mechanics, dynamics, and production problems. (Housing available.) P-1278, Aviation Week.

WANTED: THE Top job shop tool men in the country with experience designing, checking and processing on aircraft, aircraft engines and accessories. Rates that satisfy. Operating nationally. Mechaneers Incorporated, 54 Washburn Street, Bridgeport, Connecticut.

CO-PILOTS. 2500 hrs. flying time and ATR preferred. Contact Chief Pilot, Flying Tiger Line, Newark Airport, Newark, N. J., Stapleton Airfield, Denver, Colo., Lockheed Air Term., Burbank, Calif.

## POSITION WANTED

CO-PILOT MECHANIC: Commercial Flight Instructor, Multi-Engine, Instrument ratings, Flight Engineer and A&E. Fifteen years military and civilian accident free experience; a competent and thoroughly responsible pilot-mechanic. Presently employed; References in regard to character and ability. PW-1471, Aviation Week.

**Corporation Executive—Chief Pilot**

***Available September 1st***

Presently flying Twin Beech for corporation. Desires position as Chief Pilot for corporation using Twin or four engine aircraft for Executive air travel.

Well experienced in Twin Beech, DC-3, Lockheed, DC-4, and similar types. Excellent background of transport flying and instrument weather. Over 20 years experience in aviation, and well experienced in operating an efficient executive aircraft operation.

Prefer replies from those who are desirous of obtaining only the highest type personnel. References and details on request.

**PW-1484, Aviation Week**
330 W. 42nd St., New York 18, N. Y.

**FOR EVERY BUSINESS WANT**

***"Think Searchlight First"***

## WANTED

**Wanted immediately**

aircraft refueling units or mobile gasoline tank units. Must be at least 1000 gallon capacity. Please write to Mr. Spencer Ehrlich, 709 East Fontanero Street, Colorado Springs, Colorado, giving full particulars.

## FOR SALE

**1951 Cessna 195:**

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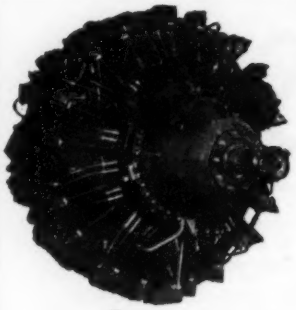

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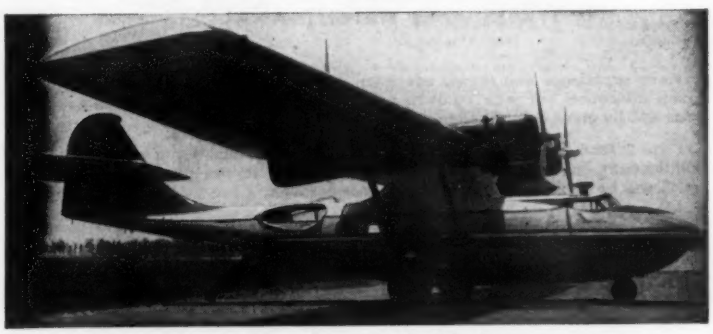

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| 93 | 923748 Oxygen cylinder (full) w/valve #X4015<br>Charges to 1800 PSI |
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| 150 | 966129 Solenoid (28 Volts) |
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| 250 | AN4014 | Erie Meter Systems D-3 hand wobble pump |
| 300 | 1H260k and KA | Pesco Hydraulic hand pump |
| 478 | D9530 | Adel selector valve |
| 233 | D9530-2 | Adel selector valve |
| 428 | D9560-2 | Adel selector valve |
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| 2000 | AN 3096-4 | Grimes Light assembly |
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*(Capt. Robson's second installment in his series on All-Weather Flight is delayed to present this timely discussion of ALPA.)*

## New Leadership for ALPA

The Air Line Pilots Assn. has taken one of the most far-reaching steps of its career in the uprooting of David L. Behncke. In his place goes new President Clarence N. Sayen.

This change indicates a new style union leadership for ALPA. It brings to the fore younger men who believe in university training in labor for its leaders, who understand labor-management problems in today's world and understand labor's obligations in business.

Consensus of airline pilots is that the change is a good one.

Some attempt has been made to cast an unsavory light upon these happenings in ALPA. The facts are simple. Labor unions, and ALPA is no exception, traditionally have strong, dynamic leaders. When several leaders within an organization have conflicting views there is bound to be action. There was action in this case.

Many factors are behind the recall of Behncke. Most important of these was the work of the Executive Board, which meets annually to formulate policies and review the progress of the association.

▶ **Sweeping Changes**—This year the board recommended sweeping changes. Important decisions were made to revise the financial structure of ALPA, to decentralize responsibility and authority and to modernize policies. The board urged:

• **In the Labor field:** "Courses in union leadership training, such as given by the University of Chicago . . . and other institutions, (should) be made available to as many local councilmen as possible."

• **In the aviation field:** To have more engineering talent available for projects and studies and for constructive action in other matters in which airline pilots have an interest. To have pilots available and qualified to serve on various projects meaningful to airline pilots.

• **To strengthen ALPA:** More attention to the pilot's viewpoint. A better-informed membership through technical papers, news letters, recordings, etc. More direct control of policy by the pilots.

Many pilots have advocated these changes for some time. They felt that with proper leadership ALPA could solve its problems more intelligently. This would leave greater resources available for the work of a professional society to advance its industry.

Much credit is still due David L. Behncke. Founding a labor organization is difficult. There are always powerful forces trying to tear down such a structure. So it was with ALPA. In early days strong, close control was imperative. It will always be a tribute to Behncke that he succeeded in keeping the foundling alive.

But times change. The expanded airline industry has made ALPA a million-dollar business. The constitution, by-laws, the policies and general workings of ALPA needed revising to permit continued progress. While several of the "old guard" view these ideas as an unlawful rebellion, the vast majority favor them.

It is no secret that ALPA prestige has gone downhill in the past few years. Failure as a group to lend assistance to technical aviation committees, failure to cooperate more closely with government bodies on proposed regulation, and many other things have weakened ALPA.

Proof that ALPA has been an inefficient labor organization is apparent in the contract negotiations on two major airlines, United and American. Both have dragged on in excess of two years without settlement.

It is generally conceded that the rejuvenated association, under the able leadership of Mr. Sayen, will be more efficient and alert and definitely stronger in every respect.

# WHAT'S NEW

## New Publications

In **A Study and Appraisal of Eastern Air Lines, Inc.,** Selig Altschul takes a sharp look into EAL's route structure, management, operations, and finance and comes up with plenty of answers as to how "Capt. Eddie" does it. The study also comprehensively details EAL's future prospects. Copies are available from Smith, Barney & Co., 14 Wall St., New York 5.

## New Books

**Getting Military Work,** by Walter Lord. Published by Business Reports, Inc., 225 W. 34 St., New York 1, N. Y. Price $12.50; 177 pages with appendices.

Manufacturers, and particularly small business owners, who have been thinking about getting into the rapidly expanding defense program either as prime or subcontractors, will find a wealth of information packed into this volume on what is being procured and who is buying it; how a manufacturer can decide whether simple redesign of his product may fit it to military needs or whether he should convert, or become a subcontractor; how to time his entry into military work; how the negotiation and bidding systems work in military purchasing; and how to decide on whether a manufacturer's representative is needed.

Of particular value is the 12 page insert of typical bid forms, which the author has filled out, annotating important points and explaining what they mean.

**Civil Defense in Modern War,** by Augustin M. Prentiss, Brig. Gen., USA, (Ret.). Published by McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 18, N. Y. Price $6.00, 429 pages, with index.

Intended as a working text for Civil Defense organizations, this data-packed handbook is divided into three sections; first, the weapons that would be used against civilian populations, including A-bombs, bacterial and chemical warfare; the second part describing means of protecting industries, homes, communities, and individuals against these weapons; and the third detailing organization needed to provide a strong civil defense organization on a national, state and local basis.

The initial section contains much technical data on high explosive, chemical, and bacterial weapons, including destructive power, velocities, explosive phenomena, pressures generated, etc., valuable in calculating defensive measures.

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# EDITORIAL

**ALPA COULD CALL IN MRA**—After reading about the plots and counter-plots within Air Line Pilots Assn., one wonders if it isn't time to call in Moral Re-Armament. We agree with Capt. Robson who comments on ALPA in this issue. Robson gives ALPA Founder & President David Behncke credit for accomplishment. However, times have changed, and Mr. Behncke hasn't. We wish ALPA and Mr. Behncke the best. But their paths, we think, should cross no longer.

•

**COLLISON STUDY**—There are signs that responsible officials in government are becoming interested in taking action to prevent mid-air collisions. More near-misses would be reported if pilots weren't afraid to talk about them. Pilots are afraid their employers or the government will turn around and take action against them for some rule infraction. If pilots can be encouraged to report violations of others, or to indicate the most critical phases of the job to be tackled first, some progress will be made toward planning a long-range program.

•

**YOU AIN'T SEEN NOTHIN' YET**—Week after week the helicopter hangs up new records of all kinds, on the battlefield and at home. We have always contended that the helicopter is the most versatile vehicle the world has ever seen. As remarkable as its feats have been, to date, they are only a hint of what you will see in the next 10 years. Don't undersell the copter!

•

**THE BRITISH TRANSPORTS LEAD**—No matter how thin you slice it, the British are well ahead of us in developing jet transports. Everywhere we go, non-aviation people ask us (1) if it's true, and (2) if so, why? The reasons are not as important as is the unpleasant fact that we trail England. AVIATION WEEK has interviewed each member of the U. S. committee that just returned from an inspection tour of British jets. The story is in this issue and we hope it helps this country get off the dime.

•

**RUSSIA, FACTS & FICTION**—What are the facts about Russian air power? Since early 1950, AVIATION WEEK has been sifting its material on the subject in rigorous fashion. As a result, not much material got through, and into print. Some readers have noticed, and asked why. "Inside stuff" is uncovered or offered to us both here and abroad, as it is to other publications. But some investigating we did over a year ago—and since—convinced us that extreme caution was necessary if we were not to be caught playing into the hands of propagandists and certain hungry news makers.

One little group, for example, was selling Russian "data" and sketches, some of which probably did come from reliable sources. But the material ran thin and we began to ask more questions. Adequate documentation was not forthcoming and we rejected a number of beautiful wash drawings, most of which popped up later in other periodicals.

Last February, for example, another magazine published a piece about two "new" Czech fighters that were "being built for the Russians." Our checking had already indicated that the original sketch of one of these so-called Czech jets had appeared in the American magazine, Argosy, late in 1948. Our own delving had also indicated that this design had originated in a Czechoslovakian aviation magazine some months earlier. It had appeared in the April issue and readers of the native language noted easily that this was meant to be an April Fool feature. Yet this design of the April Fool origin still lives in the current literature about Russian aviation. We also recognize some Russian data which did survive our own checking and appeared exclusively in AVIATION WEEK. It reappears in rewritten form here and there.

No aviation publication is interested in underestimating the Russians. Nor is AVIATION WEEK interested, either, in over-estimating them. What we are trying to get at, obviously, is the truth.

The New York Times' military writer, Hanson Baldwin, pointed out last week (July 24) that some military officers "sharply challenge the 'facts' published about Soviet air power—and Russian strength in general—and declare that each service has used inflated and exaggerated estimates of Communist strength, first, to be on the safe side, and second, to support in the Pentagon and in Congress their own service estimates of their needs. These officers also are sharply critical of the point of view that Russia now is superior to the U. S. in the air. They even challenge the superiority of the MiG-15, the jet fighter used in Korea, and stress that it achieves its higher speed and greater rate of climb at the expense of range. The constant exaggeration of Russian strength and the minimization of our own have inevitably weakened our diplomacy, these officers believe."

It is interesting to note, at this point, that when AVIATION WEEK went directly to USAF intelligence officers to learn the background of Gen. Vandenberg's testimony that the MiG-15's powerplant was superior to anything the Air Force had in Korea, we learned (and were cleared to print it) that this assessment of superiority was based on what our Air Force thought the Reds would ultimately be able to pull out of this engine rather than on its present output. In other words, it will be better than our best Korean jet engine is now.

Some of the material being published about Russian air power undoubtedly has some degree of authenticity. Some of it—perhaps much of it—does not, and is balderdash. We are convinced that complacency in this country about the Russian menace would be disastrous. But the truth can beat complacency fully as well as overdone propaganda—and it isn't as likely to have that bitter after-taste.

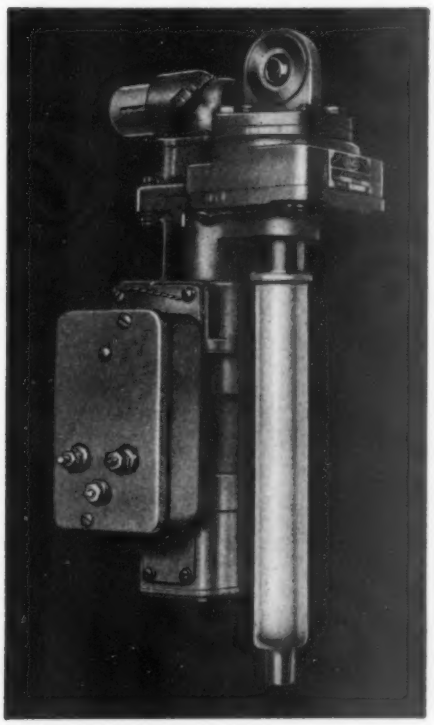
—Robert H. Woo

EEMCO technical bulletin

# Featherweight Linear Actuator for Jet Wing Flaps

Typical of EEMCO's forward-looking designs is a new linear actuator for jet aircraft wing flap systems developed in close cooperation with a leading air frame manufacturer.

Two actuators are interconnected by flex shafting. A single brake operated by either motor provides quick and accurate positioning for system—maintains it under all conditions of load and vibration. In case of emergency either actuator can safely operate the entire system under any condition of ambient temperature and under maximum load with a supply voltage as low as 20 volts. Entire assembly weighs only 8 pounds, 3 ounces.



## Actuator Screw Jack Data

Normal load 3000 lbs.,.4 inches per sec. at 26 volts

Ultimate static load—ten thousand pounds compression in a fully extended position

Working stroke—5.14 inches

Non-jamming end stops

Provision for power takeoff or hand drive (right angle)

Radio noise filter for AN-M-40

Explosion proof construction

Weight—8 lbs., 3 ounces

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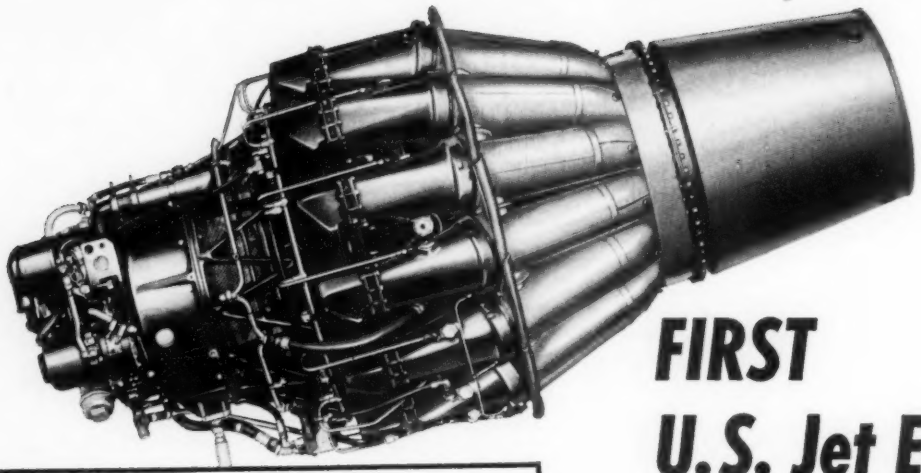
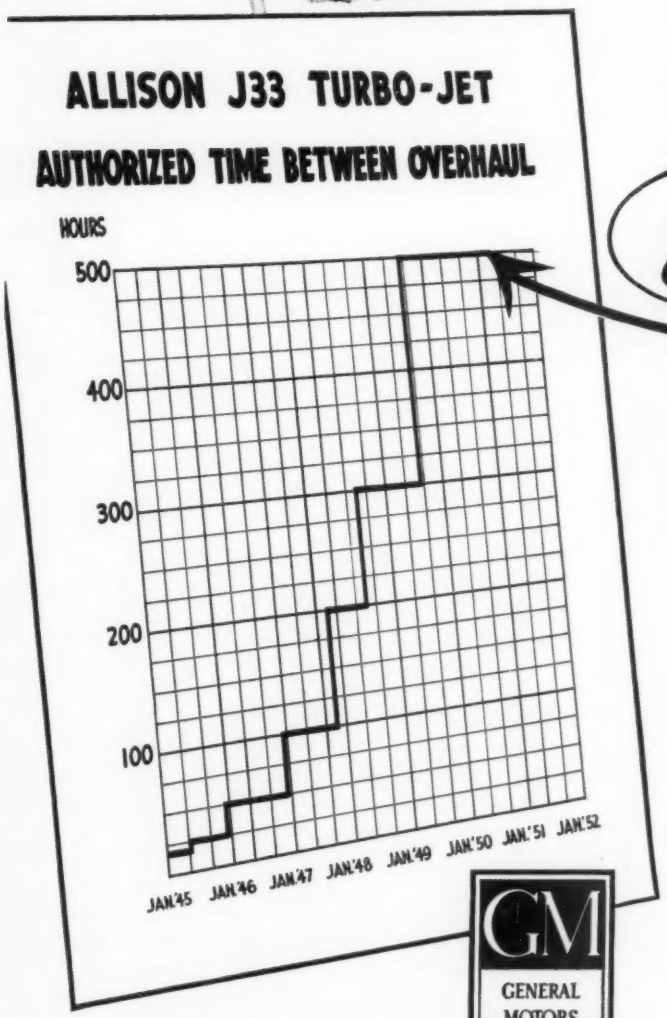


# FIRST U.S. Jet Engine approved for

## 500 HOURS

## operating time between overhauls




***by authority of Maintenance Division, Air Materiel Command, U.S. Air Force***

FIVE hundred hours operation between major overhauls is now allowed on Allison J33 jet engines. At that time, if complete inspection shows engine meets required standards, an extension of 200 additional hours is authorized with periodic inspections. It is typical of Allison dependability that many J33 and J35 engines are operating 700 hours between major overhauls.

Behind this proof of dependable service stands good engineering and manufacture by Allison—plus excellent work by flying and maintenance personnel of the U.S.A.F. and Navy. Such a record would not be possible without the total experience of 800,000 hours flight time amassed by 10,000 Allison jet engines.

That is experience where it counts most —*in the air*—and another reason why Allison leads the field in both the breadth and depth of its turbine engine experience.

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